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The "Revue Générale de l'Architecture."

WE have from time to time given some attention to the progress of architectural journalism and architectural illustration in France, as reflected in the pages of our much-esteemed contemporary, the *Revue Générale*, still occupying its leading place under the guidance of M. César Daly. The present season of the year, when active operations are more or less temporarily suspended, seems a not unsuitable one for looking about and noticing what our neighbours are doing. We arrange a certain number of parts of the *Revue Générale* before us, therefore, as a gallery of illustration not only of French architectural journalism, but of recent architectural work across the Channel, in its main styles and tendencies as illustrated in the fine engravings of the work before us.*

The difference between French and English fashions in regard to this department of journalism is illustrated in the very form and manner of issue of the *Revue* as compared with the *Builder*. The *Revue Générale*, the only journal of architecture in France which can fairly claim the highest rank of importance in regard to the matter and manner of its contents and its illustrations, is hardly in any sense a journal of architectural news, nor is it even published with absolute regularity of date or interval. About twelve numbers are published in a year, at intervals of about a month, but they are not dated by months even, and come out, we suppose, when it is most convenient, and when sufficient matter of importance has been collected, and sufficient illustrations are prepared. This form assumed by the leading French architectural journal is one among a good many examples of the peculiar demand made by the French public on journalism of this class, of what they do and what they do not require. The French architectural public seem content to wait indefinitely for their periodical literature, provided it is in a satisfactory form when it does reach them. The volume of Transactions of one of the architectural conferences at Paris was not published for nearly two years after date, after the most elaborate editing and revision. Such a paper as the *Revue* would not, of course, meet the views of our *clientèle*. They demand not merely (perhaps we shall be right in saying, not chiefly) essays and illustrations, but also regular professional news brought up to date, and a paper which may be a field for the immediate interchange of correspondence upon all subjects connected with the profession and its surroundings; its achievements, its prospects, its wrongs, and even its misdeeds, which latter have to be confessed now and then. For all this there is little or no place in the *Revue Générale de l'Architecture*; there is no medium for it at all corresponding to that of the *Builder* in England, and it does not seem to be wanted. On the other hand, a paper in the style and with the scope of the *Revue Générale*, would probably find no public in England such as would enable it to pay its way. As the *Revue* continues to all appearance as flourishing as ever, we may presume,—indeed, we are able to assert,—that its production does pay, though the fact may be difficult of comprehension to those who have had any experience of architectural journalism in this country.

Taking up a number of the set before us, we find it a series of essays more or less elaborate, grouped under the heads of "Histoire," "Théorie," "Pratique," and "Mélanges," and under one or another of these groups, each of which has its characteristic ornamental heading, all the matter of each number is to be found appropriately grouped. Sometimes one section of the four is unrepresented; there are several numbers before us in which "Théorie" is not to be found; but these heads seem to include everything, at greater or less length, as the case may be. French periodical literature, of all classes, is nothing if not systematic. In the first number that comes under our hand we find under the head "Histoire" only a brief notice of a tomb in St. Étienne at Toulouse; under "Théorie" there is a mathematical paper of some length and elaboration, on the effects of the thrust of the vault in some Mediæval churches in thrusting the piers out of the perpendicular ("Flexion des Piliers d'Église"),—a paper which appears to us to make rather more complication than is necessary out of a comparatively simple matter. "Pratique" gives the commencement of an article by M. Laveszari, to be continued in a succeeding number, on the Lunatic Asylum of Saint Anne, at Paris; and "Mélanges," which is by far the largest portion of this particular number of the paper, commences with an article by the editor (of which more anon) on "Engineers and Architects," followed by a critique on "Les Envois de Rome in 1877" (the designs or restorations sent in by the students who have been working at Rome), a letter from Philadelphia on the architectural works in the Philadelphia Exhibition, a lengthened report of the proceedings of the fifth session of the Congrès National des Architectes, and a "chronique judiciare," a summing-up of the principal legal proceedings arising out of building operations during the half-year, and not so much in the nature of news as of a critical examination of the cases and of the judgments passed, and the possible results on architectural practice. Two articles dealing with proceedings a year apart in point of time,—the Philadelphia Exhibition in '76, and the Architectural Congress in '77,—thus find place in the same number. The Philadelphia notice would have been considered quite out of date here, of course. The opening of the report of the Architectural Congress is amusing, as showing that like causes produce like effects, in Paris as in London. "About sixty persons were present at the opening meeting of the session, which was held according to custom,—but in a temperature exceptionally stifling,—in the hall of the Hemicycle of the École des Beaux Arts. Among those present we counted about twenty architects from the provinces. These last are the really assiduous members of the Congress; they come to nearly all the meetings, remain to the end, and are very ready to take their turn in speaking. Too many of our Parisian brethren, on the contrary, content themselves with a brief appearance at the commencement of one or two sittings, brought there evidently by the reproaches of conscience only; then, after a few moments, when they are quite certain that their appearance has been noticed, they glide adroitly to the door, and go about their usual business with a conscience set at rest." It is needless to observe that the articles are all signed; a practice concerning which, without going into all that might be urged for as well as against it, we will merely observe that it may do in France, but experience is against it, as a rule, in England.

Concerning M. Daly's essay on engineers and architects, we may say a word, since it is a subject interesting to ourselves, and on which we have before now been led to speak. The article was apparently wrung from the apologetic conscience of M. Daly by the manner in which the toast "aux Ingénieurs," proposed by him at an architectural congress dinner, was regarded by some of the younger members of the architectural profession present on the occasion. This was in 1877, and might be said to be out of date for remark now; but the want of unity between the two professions is as apparent in England as it appears to be in France, and it may be of interest to some of our readers to notice the remarks thereupon of a leading French architectural critic. From the commencement of the century, says M. Daly, architects and engineers have, in France, regarded each other "avec plus d'étonnement que de bienveillance. On croirait le dieu $a + b$ et la déesse *Fantaisie* en train de se dévisager réciproquement"; and the chronic hostility between them he regards, as of course in the main it is, as the result of natural misunderstandings in

* Other articles and the illustrations in our present issue, together with many recently given and others still in course of preparation, will further serve to make evident the position of things architectural in France.

regard to the requisite objects and ends of the two professions. In order to establish an understanding between them, it is not necessary, he thinks, that either architects or engineers should renounce their characteristic tendencies; on the contrary, "they are each distinct and complementary organs of one complex function,—that of the art of building." Thirty-five years ago, M. Daly had heard an old member of the Institute, a professor of architecture, and an "*homme de mérite*" in other ways, affirm that questions of construction in architecture were only the business of the contractor! We do not know that any one has had the boldness to positively affirm such a theory on this side of the channel, although some members of the profession seem practically to act upon it. It may be observed, however, that the progress of things seems to have been in the reverse way in England and France; for with us the architect who does not want to know anything about construction is rather a recent development of the æsthetic school; while in France, apparently, an increasing importance has been attached to questions of construction lately, and the purely æsthetic or designing architect is a relic of the last professional generation. The eclectic school with us at this moment is a school of purely sentimental architects; the eclectic school contemplated by M. Daly is one which, besides using and absorbing the artistic designs of the past, lays hold also of all the progress of pure and applied science: "l'architecte, depuis une trentaine d'années, s'est donc rapproché de plus en plus de la science." Under these circumstances it would seem that the gulf between the architect and the engineer in France is in a fair way to being bridged over. But the latter, says M. Daly, has been guilty of the opposite fault from that of the exclusively æsthetic architect, and has regarded beauty as entirely out of his province; an idea in which he seems, in France, to have been officially assisted and supported, for mention is made of an official circular addressed by an inspector-general to the Government engineers of roads and bridges, "qui recommandait fortement de s'écarter de toute préoccupation du beau." M. Daly, however, speaks positively and hopefully of the increasing mutual understanding of each other's subjects by the two professions, mentioning that the engineers study the history of architecture, and even write well upon it, and cites three books on architectural subjects by French engineers.* In that case there certainly is hope for the ultimate unity of the two professions in France. No English engineers, as far as we remember, write works on architecture; and, on the whole, perhaps it is better they should not for some time to come.

A paper on "La Numismatique et l'Architecture," in the next number we take up, suggests a branch of study in connexion with the history of architecture which ought to yield some interesting results if systematically followed up. Of course, reference to coinage in illustration of art and manners and costume is no new idea; in regard to architecture, the evidence of coins has occasionally been drawn upon in this country in regard to special points, as in the coin illustrations of the Ephesus Temple, which Mr. Wood has made use of to throw light on points in the restoration of the temple, and we do not forget our excellent friend Professor Donaldson's charming book on the subject. M. Lenormant, the writer of the article, refers especially to the important illustration of circular temples which coins and medals have furnished to the architect. M. Questel's elaborate article on the Saint-Anne Lunatic Asylum (before-mentioned) continues in this number, and affords important suggestions and information as to the latest new ideas in the treatment of such buildings in France, for which we must refer the reader to the *Revue* itself. A "Revue des progrès des sciences dans leurs rapports avec l'architecture," in the same number, is entirely occupied with the telephone; of course, a perfectly fitting subject for an architectural journal to take up; its special "rapport avec l'architecture" is, however, hardly made out.

Those of our readers who remember how largely the *Builder* has been occupied, ever since its commencement, with sanitary questions, will appreciate our satisfaction in finding the paramount importance of this class of questions so fully recognised as it is in the leading French architectural paper, in the few remarks of the editor as introductory to a series of papers on the utilisation of sewage ("De l'utilisation des eaux d'égout"). We ourselves have not unfrequently been taunted by æsthetic people, directly or indirectly, with too great a devotion to sanitary subjects, to the detriment of the prominence which ought to be given to the artistic side of architecture. Well, what says the editor of the *Revue Générale de l'Architecture?* "Aujourd'hui il n'y a qu'une opinion dans le monde civilisé: l'hygiène, c'est-à-dire la vie saine, la force et la santé, avant toute chose! . . . . La vie d'abord, la charme ensuite." And he adds further,—"Combattre dans la maison toute cause de corruption (à la cuisine et ses dépendances, dans les cabinets privés et leurs accessoires, les dépôts de linge sale, &c., &c.) *est aujourd'hui le premier devoir de l'architecte.*" So that if we have sinned in too earnest a devotion to the sanitary powers, we are not, at all events, without fellow-sinners whose principles on the subject are, in theory at least, as stern as our own, though their practice may not perhaps have been (if we may be allowed the remark) so active. Indeed, M. Daly seems to admit that the subject of sewers and drainage has not found so large a place in his columns for some time as it might rightly have taken. The series of papers which he introduces to his readers are by M. Bazaine, an eminent engineer, and deal in the first place with the various stages in the pollution and subsequent purification of the Seine. Subsequent numbers in continuation of the article go a good deal into detail as to the utilisation of sewage, with illustrations of various points in the mechanism of irrigation and of the carriage of sewage, which, whether superior to our own methods or not, will interest those who are practically concerned in the subject. The same number gives the first part of an essay, by M. Ravon, on "Les Honoraires des Architectes," which treats on a subject so important to the profession, and in so suggestive a manner, that we may very possibly take an opportunity of considering some of the views maintained in it more in detail and in reference to some questions as touching the profession in this country: at present, we content ourselves by alluding to the article.

"Les fouilles des Mycènes" is a subject which interests all the civilised world; and we observe that M. Emile Burnouf, in the course of his remarks thereupon, touches on the same point on which we have before strenuously insisted, viz., the importance of the gold work discovered by Dr. Schliemann as bearing upon the illustration of the history of Greek art, more especially in showing that ancient Greek art was not Egyptian in its origin (art, that is to say, in its more plastic forms, we presume; for Greek Doric architecture obviously is of Egyptian origin). "Depuis plusieurs années on avait remarqué l'analogie des sculptures de la *porte des Lions* et de sujets similaires fréquemment figurés sur les cylindres et les pierres gravées Assyro-Babyloniens. On en avait conclu, mais comme une hypothèse probable, que l'ancien art Grec, au moins en Argolide, avait ses racines dans l'Asie et non sur les bords du Nil. Les fouilles de Mycènes ont pleinement justifié cette supposition."

An article, from the pen also of M. Burnouf, on "Les maisons privées de l'ancien Athènes," is also founded on some recent excavations, those of the "Société Archéologique de Grèce," but, to say truth, seems to prove only how little domestic architecture there was among the Greeks, or how little trace of it is left to us. An elaborate descriptive article of the processes and methods of construction employed in some parts of the Great Exhibition building is useful as a record of the difficulties connected with such a building, and the way in which they were met; and we notice a letter to the editor from M. Richaud (architect) commenting on the article on architects and engineers before referred to, agreeing with the editorial article in the main, and observing that in regard to the architectural profession "ce qui a fait et notre isolement et notre infériorité dans ces derniers temps, c'est notre faux point de vue en matière d'esthétique et notre manque d'instruction scientifique dans la pratique et dans la mise en œuvre de notre art." This is exactly what is making "notre isolement" in this country at this minute: a false æsthetic to begin with, and a wilful neglect of the practical side for this false æsthetic.

Among the obituary notices of deceased French architects is an interesting one, by M. Radoux, on Eugène-Louis Millet, who was an early combatant, partly under the banner of Viollet-le-Duc, against the conventional architectural school of France, and in favour of freedom and romanticism. A paragraph describing his habit of working is worth quotation, as giving a very well-expressed *résumé* of what should be the method of regarding and working out a problem in building design by an architect practised in his craft and treating it according to a logical method:—

"Sa facilité de travail était surprenant. Rompu aux difficultés du métier, il abordait une construction nouvelle avec l'aisance d'un sculpteur qui pétrit une marquette ou d'un peintre qui brosse une esquisse. En peu de temps il avait mit son projet sur pied, et l'exécution suivait toujours méthodique et régulière jusqu'à l'achèvement de l'œuvre. Quand il avait arrêté la disposition générale des lignes, les détails se co-ordinaient comme d'eux-mêmes; et si parfois l'ornementation n'était pas aussi bien réussie qu'on l'aurait désiré, elle n'avait cependant rien de choquant, parce qu'elle était toujours à sa place, parce qu'elle se fondait dans l'harmonie de l'ensemble. Il procédait toujours du simple au composé. En homme pratique, il se préoccupait d'abord de l'ossature, et quand il l'avait raisonnée et équilibrée dans toutes ses parties, alors il habillait son édifice suivant les exigences de sa destination, et les ressources dont il disposait, mais toujours de façon à laisser deviner sous les plis du vêtement, une plastique saine et vigoureuse. Avec lui, point de détours, ni de tromp-l'œil; la sincérité était une des qualités dominantes de son talent comme aussi de son caractère."

M. Millet, in addition to his general practice, held the post of inspector-general of diocesan edifices, and we noticed, if we remember rightly, some beautiful drawings by him, representations of buildings in their actual state and of restorations, among the drawings of the "Commission des Monumens Historiques," exhibited some time ago in London.

A paragraph is devoted to Sir G. G. Scott in one of the "Nécrologie" articles. One would certainly have supposed that Scott, though an English architect, had filled a sufficiently large place in the profession to have claimed a special notice; but the fact probably is that the class of work in which he was mainly engaged was one with which there is little sympathy in France, where Gothic is not popular, and, we may add, is not much understood in modern days. The fact is mentioned that some members of the profession in England have found fault, "vivement," with Scott's restoration, or rather with the whole theory of restoration. Into that debated question the *Revue* (the article apparently is editorial) does not care to enter: "Mais la justice nous oblige à noter que l'on s'est à peu près universellement accordé à reconnaître la conscience et le talent qui Sir Gilbert apportait dans les travaux qui lui était confiés."

A few lines of very cordial recognition are bestowed on poor Cockerell, with the promise of an article specially devoted to him (which, however, we have not been able to find); but Cockerell practised a style of architecture very much in harmony with French tastes, and the merit of which would be specially appreciated by French architects and critics.

Touching upon this point of style, leads one to look at the illustrations which accompany the *Revue*, and the light they throw upon French architectural taste and practice at present. As to the manner of the illustrations, too much praise could hardly be given, especially in regard to those which consist of geometrical drawings, elevations, and details, which are got up with beautiful neatness and finish. The perspective views, "gravures à l'effet," as the term is, are, though equally finished, somewhat hard and mechanical to English taste, which has possibly run a little too much in the direction of "effect" of a rather too picturesque and splashy nature, while in these French drawings "effect" is just what seems to be wanting. But the fact is that the kind of element in art, in architecture, and in architectural drawing, which we call "the picturesque," is radically alien to French proclivities, and consequently when they try it they seldom do it well. There are a good many buildings among the illustrations, chiefly of a domestic character, in which wood is largely used in ornamental construction and in pure ornament, and hardly any

* "Traité de l'Architecture," by M. Léonce Reynaud, "inspecteur-général des ponts et chaussées"; "L'Art de bâtir chez les Romains," by M. Choisy; and "Études sur l'Architecture Lombarde," by M. de Dartein,—both the latter being engineers in the same department of *Ponts et Chaussées*.

of these are good from our point of view: they are too "filagree" in treatment, and too ornate for a style of work in which the expression and effect should depend mainly on the lines and general character of the construction than upon ornament. But this class of work, which aims at the picturesque, and which has acquired with us an undue importance of late years, is, we must in fairness remember, not that into which French architects put their best mind and their best efforts. If we want to realise the best of contemporary French architectural design we must turn to the class of work in which elegance, high finish, and a certain expression of luxurious civilisation are predominant, and here the French architect is *facile princeps* among his European contemporaries. The revived Jacobean and Queen Anne styles as now practised by some English architects come the nearest to this walk of French architecture,—but it is with a great difference; for this development in England, whether or not it may lead to anything better eventually, is at present little better than mere blind and illogical copyism, the using up together of a *pot-pourri* of debased Classic materials. But the French are making a real effort to elaborate a style out of Classic elements, what may be called a Greek-French style, and with results which exhibit often a great degree of originality and refinement; occasionally, also, too much of Roman lavishness, display, and over-exuberance. We see the latter qualities in the details of the Théâtre de la Renaissance, clever, and in their way effective, as they unquestionably are; we see the finer qualities of French Classic work to the best advantage in some of their smaller decorative and monumental works, as in the exterior fountain of the St. Claire Market at Grenoble, by M. Riondel (plate 27 in the *Revue* for 1877), and in the simple but refined and suitable monument of Henri Labrouste, designed by his son, M. Leon Labrouste; and still more in the noble monument to Regnault, of which an engraving was given in the *Builder* some time since, and of which, in the numbers of the *Revue* now before us, there is a large coloured elevation, and a number of details on a large scale. French art may well be proud of this monument to one of the most brilliant and gifted sons of modern France; there has seldom been a better example seen of the complete blending of the art of sculptor and architect in one homogeneous result completely expressing its purpose, and carried out with the greatest refinement in every detail. In this respect it may deserve comparison with Stevens's Wellington memorial, to which it is superior in detail, though not equal in the grandeur of manner and conception in the sculpture; we trust that it is not, like our countryman's work, placed so that it can never by any chance be properly seen. A great deal of the characteristic excellence of French domestic architecture is exhibited also in the front of the Hôtel Privé, Rue Legendre, by M. Hermant (plate 19, vol. 1879), and in the painter's studio, Boulevard Arago, by M. F. Huguelin (plate 10, vol. 1878), which last, in spite of some slightly eccentric detail, is a truly admirable and original treatment of a special class of building, in such a way as to be at once practically suitable and architecturally expressive: one can see at a glance that it is a studio for painting, and can, in fact, be nothing else. Some of the works we have alluded to, as well as others that are illustrated, are strongly suggestive of the finished and painstaking character of French architectural design, where trouble is spent in elaborating the smallest detail in a manner which we fear has very little parallel in architectural design in this country. The French, however, make the mistake, it must be admitted, of carrying over-refinement into situations where it is not suitable, and where, in fact, it becomes weakness. If we were to define the general position and tastes of the architectural profession of France and England at present, we should say that the French architect ought to build town mansions and the English architect country houses. Each has something to learn from the other.

We conclude our remarks on the *Revue* with cordial wishes of continued success to our able French contemporary.

Proposed International Exhibition at Berlin.—It is announced that the Emperor William and the Crown Prince have approved a project for the holding of an International Exhibition at Berlin in the year 1885.

THE PARIS EXHIBITION OF SCIENCES APPLIED TO INDUSTRY.

It is not a little indicative of the nature of the Exhibition at present being held at the Palais de l'Industrie, that the Parisian press should have said as yet so little concerning the show, which has now been open six weeks; for, with the exception of a few evidently interested paragraphs, nothing, after the account of the inauguration and the recent visit of President Grévy, has been said of any of the interesting exhibits collected in the Champs Élysées. Certainly, old sightseers cannot fail to recognise too many objects which have figured in all the exhibitions of the last few years, but there remains none the less much to be said, were it only to notice this somewhat tiresome repetition. But setting aside these, there are, it can be understood, exhibited many suggestive inventions and applications of science to industry that deserve notice, when, as in the present day, the mechanical arts afford as interesting a theme for discussion as the liberal arts, in the former of which are understood to rest most of the productions indispensable for the maintenance of life and the satisfaction of our material needs.

Those branches of industry which contribute so largely to the happiness of social life are no less useful than the more abstruse arts, but yet, by a strange perversion, these latter are only too often the object of an exaggerated esteem and admiration, while too little interest is expressed in the modest artisan whose work satisfies our wants at every moment. Let the different labours of each be judged according to their degree of utility and necessity, and the public will easily rectify the error it so often commits. Far from despising the mechanical arts, they cannot, on the contrary, be too warmly encouraged and multiplied; for they are, on the one hand, an absolute need in our existing social order, and, on the other, an active instrument of civilisation in their encouragement of industry,—and industry has at all times been recognised to form the foremost wealth of a nation. It was Bacon's opinion, and that of Colbert, the honest minister of Louis XIV., who devoted all his efforts to favour the agriculture and develope the industry of his country. It was the sentiment of a famous writer of the last century when he wrote, "He who introduced from England the invention of the stocking-loom, who brought into France the manufacture of velvet from Genoa, of glass from Venice, did little less for the State than those who fought its enemies and conquered their cities."

Continuing the classification referred to in our last account of the Exhibition, based, it will be remembered, on the grouping of the exhibits according to their place in the household, after hastily reviewing the important group of building materials, it is a natural step to the next consideration of the ventilation and warming of the dwelling; but previously let us mention an exhibit which should properly have found a place in our last notice, the interesting model in relief of a house in course of erection, a reduction to the scale of five centimètres to the mètre, or roughly about 2 in. to the yard, a model in which the whole method employed by the French in building a town house is completely placed before one, with all the various apparatus of scaffolding, windlasses, and pulleys, with models of all the tools, and the systems of laying the various portions, whether of brick, stone, iron, or cement, with each exterior stone numbered, as also the iron beams and roofing; here, in fact, one may study the whole organisation of a French *chantier*, or work-yard, on a scale sufficiently large to enable the model to be perfect in every detail. The building which it represents was executed last year in the Rue de Rivoli, and the rapidity of execution obtained is stated by M. Emile Desplanques, the praiseworthy exhibitor, to be at 23 centimètres daily on an average, some 8¼ in. Such a model is, it may be understood, of valuable assistance in a technical school, and might usefully be obtained for England.

The materials having been discussed, it is a consideration of the first importance that the house should be constantly ventilated, and in winter equably warmed. Natural ventilation is obtained by the situation of windows and doors opposite each other, and various other simple means needless to summarise. Artificial ventilation is a difficulty which has long occupied the attention of the profession, and various are the exhibits of atmospheric modifiers, ventilating propellers, producers of heat and cold, apparatus for the extraction of organic corpuscule from the vitiated air, &c.* And then the means of heating; where to begin?—what to mention?

Certainly, in examining these complicated and simple apparatus, it is difficult to imagine the possibility of existence in the days when the brazier or the huge open-fireplace formed the only means of warmth, when whole logs crackled and blazed, imperfectly heating the circle huddled round the hearth. From the days of John Winter and Franklin, down to the latest inventions, what improvements! and what innumerable heat-producers, from the modest stove with its daily cost of 1d., to the huge calorifer, which heats an abbey or a palace! But we are still far from a knowledge of the means of combating our worst enemy, the cold, and the severity of last winter made every household feel the imperfection of the means at present adopted for the attainment of even moderate comfort. Strange to say, England, which bears the world over the reputation of understanding essentially in what comfort consists, does not stand first among the nations which have adopted efficacious means of keeping the house warm when the housewife has ordered fires to commence with the traditionary All Saints' Day; and certain it is that our persistent adherence to the open fireplace leads us into an immense and useless consumption of fuel, and a minimum of heat radiated, the ill-consumed fuel additionally impregnating with blacks the thick air of our great cities.

Both the stove and the open fireplace have their partisans and opponents. The friends of the stove urge that the grate consumes much combustible, scorches the persons nearest it, and ill succeeds in heating the room; the friends of the grate—that the heat of the stove is noxious, and some have even refused to visit certain friends who made use of stoves; each and all of which are exaggerations. The most useful objects may be rendered harmful by abuse, while the reasonable employment of good things cannot fail to be beneficial.

In the use both of the stove and the open grate, circumstances and locality must be taken into consideration. In the work-room and the dressing-room, the stove is certainly to be preferred; in the dining-room, in the reception-room, and the bed-room, the open fireplace, for the sight of the fire produces an agreeable effect, sensible even to the most indifferent, while in the bed-room the open fire serves as an excellent ventilator. With regard to the defect of the open fire not heating the room, and the danger of the stove rendering the air vitiated, these are difficulties which have already been overcome, and which will in course of time be even further brought to perfection. In the Paris Exhibition of last year might have been noticed the well-known application of the air-chamber at the back of the grate, taking the place of the old fire-plate; as to the various other methods of heating by hot pipes, and by stoves, we have in the present Exhibition no want of models.

Happily for England, the cast-iron stove has received little encouragement, and the terrible example offered us by the United States (where the usual intelligence of the native is strangely wanting in the continued use of the cast-iron stove) and some few corners of Belgium, has served to set in work the inventive faculties of the manufacturers; and for the purchaser it can only be an *embarras de choix* to choose from such an exhibition as that of the Palais de l'Industrie the stove that most meets the requirements of his climate. Economy of fuel and large production of healthy moistened heat are advantages that they all offer, even if their appearance may not as yet satisfy the exigencies of the person of taste. For such, there always remains the so-called "porcelain" stove, with its agreeable heating powers, and its pleasing appearance.

Into the consideration of *calorifers* for the heating of large buildings, it is needless to enter. In this branch our country offers many important and effective examples well known to the professional world, but in the more modest warming of our dwelling-rooms it is useless to deny that we have still much to learn from our neighbours.

If the present exhibition affords little scope for the examination of the next important consideration, the question of light, which so

* Among these, deserve mention the apparatus of Messrs. Lacomme et Cie., and those of M. Garlandat and M. Dumuis, and Javell & Carsley.

naturally follows that of heat, there is no want of models of excellent pumps for the supply of water. The electric light is still in a state of dormancy, and until future exhibitions have brought under notice a perfected form of the electric lamp, we must continue to burn imperfect gas, petroleum, oil, and candles.

For the raising of water, and its distribution to each part of the house, there are numerous excellent models to be seen in the annexes of the Palais de l'Industrie, each and all of which merit careful attention from the interested observer*; in every case it is now placed in the power of the most modest purse to possess a hydraulic pump able to raise from the well sufficient water for all domestic purposes, including the bath, disposable at any moment and at a great saving of time, of fatigue, and expense. But still in this country how few are the families which profit by these ingenious applications of science to industry? And the patriarchal bucket still continues to draw up from the well the daily supply of water as in the days of the beautiful incident of the woman of Samaria.

Hydraulic machines have drained the Haarlem Sea, but are introduced with difficulty into the household, where, if the bucket does not still exist, the traditionary and fatiguing pump-handle is enthroned in glory. The civilisation which imposes on our municipal authorities the obligation of reforming the sewers, of levelling the roads and streets, and lighting our thoroughfares with gas, if not with electricity, has not yet penetrated to every house, and hence within but a short distance of the princely dwelling, or the house where are adopted the most recent and improved inventions of hygiene, may be found habitations without air, without light, without water, hotbeds of material and moral infection. Since in social life everything is connected, it is not unreasonable to argue that where enter water, light, and air, there penetrate also the book, the journal, the magazine, and the piano, and with the culture of the mind, gentleness of thoughts and refinement; but where reign the sickening heat and fumes of the ill-ventilated, ill-lighted, ill-cleansed habitation, there must be fostered the worst inclinations, depravation, and vice. "As the home, so the people."

If fate has denied us the superfluous, let us at least see that our home is not wanting in the necessary: let us be lavish of air, of light, of heat, and of water, which preserve health and cleanliness, and correspond to the other liberal gifts,—to science, to knowledge, and to love, to the enlightened mind, and the spotless conscience.

THE ARCHITECTURAL PRINCIPLES OF ROOF DECORATION.

The question which we have recently discussed as to the decoration of the Dome of St. Paul's leads the thoughts very naturally to dwell upon the general theory of roof or ceiling decoration. We may not find that an inquiry of this nature leads to results as incontrovertible as those which may be expected from a purely scientific investigation. We shall find, indeed, that even in buildings of admittedly high order of architectural merit, opposite principles of roof decoration have been adopted by great architects. But we think it cannot fail to be of use to inquire into the nature of these principles. And if we arrive at the conclusion that certain structures, which display an extraordinary amount of sumptuous and elaborate work, have been raised and adorned upon principles which are opposed to the grand rule that structure should control decoration, the conclusion will not fail to interest. We may admire what there is of excellence in such works, in spite of their radical faults; and, at the same time, we shall be guarded from imitating the faults in any attempt to emulate the excellences.

To decide on the rules for roof decoration we must first bear in mind the essential character of the roof. If we seek for a single word by which to express the function of the roof, we can find none so good as the plain English word "shelter." To shelter inmates from the inclemency of the weather is the primary object of the roof. And to shelter them from cold and wet is almost the exclusive function of the roofs of northern countries. This may seem a trite remark; but it is one that has to be made in passing, because shelter from the vertical rays of the sun is far more important in Southern Europe, and in tropical regions generally, than in our English experience. And the kind of shelter which is most required is a qualification which has a considerable influence on the adoption and development of architectural style.

With the exception of the case of the cavern, which is a natural shelter that has influenced certain styles of architecture, the roof is a thoroughly artificial element of structure. It is not one for which we can seek the prototype in nature, or as to which we can derive much that is of value from the study of the habits and operations of the inferior animals. The roof, regarded as the creation of human skill, has four natural forms. It is modelled either on a tent, a shed, a vault, or a cabin. Originally formed either of a textile fabric, or by the work of the woodman or of the mason, the exigencies of the material adopted have stamped their impress on the workmanship, and continually reappear in any form of suspended, inclined, or vaulted roof. In our own climate and country the forms of the internal and of the external roof for the most part differ. For the former, we have the idea of the cabin, or the simplest example of that trabeate structure which has risen to its noblest form when carried out in the Classical orders. This idea dominated the greater part of our domestic architecture in Shakspearian times, and we owe to it the convenience of raising story above story, and the box-like form of our smaller dwelling-houses. Thus the floor of one room,—a bit of carpentery or joiner's work, of which we have probably the earliest examples in the ship cabin,—forms the ceiling of the room below. While the shed or sloped roof is usually adopted for the external shelter of our buildings, as must always be the case in countries liable to falls of snow, the trabeate, box, or cabin shape has become so familiar from daily use, that we have come to think a ceiling to be as simple and natural a part of a building as a wall. Such being the case, the next unconscious step is to regard the decoration of the ceiling as a matter closely akin to the decoration of the wall. It is here that we hold that a pause should be made; and that a consideration of the essential differences of these two portions of the interior surface of a room should be duly weighed before we begin to talk of decoration.

While the trabeate structure, or the working out of the idea of the cabin, or framed wooden house, must be regarded as furnishing the principal motive of most of our interior roof work or ceiling, the vaulted structure, from the simple form of the semicircular vault to the most elaborate groining of pointed arch-work, or to the beautiful enormities of the Tudor chapel roofs, shares our favour in many public buildings. The first point here to bear in mind is, that in any attempt at decoration, the essential differences in the motives of the several styles must be borne in mind. It is from confusion in this respect that difficulties arise; and that people are led to question, as "matters of taste," constructions which are plainly indefensible as matters of science, or of decoration truly moulded on principles of structure.

It might be thought unnecessary to say anything as to the first form of roof to which we above referred,—that of the tent,—in a country in which there is so little to recall that early and temporary form of structure as in our own. In the East, indeed, the tent has become crystallised in the pagoda. The graceful curved roofs of Chinese and Indian temples have borrowed their characteristic outlines from the natural curves of the tent. In England, where the pagoda has been introduced, it has usually sunk under the weight of public ridicule. It has never taken root with us. But it does not follow that we have exhausted the architectural capabilities of the tent form. The hollow curves of the textile roof are outlined by nature. They are the natural result of the straining of a textile material to obtain a shelter. And the reason for which we conceive it to be not impossible that the tent form may hereafter be displayed on a large scale in our landscape is, that we are now introducing for roofing a material which bears a strong resemblance to the sheeted covering of the tent. In the French tongue the use of the word *toile* is highly suggestive of what we mean. In English we speak of sheet iron. The largest roofs that have recently been constructed in England have been reared on frameworks not very dissimilar in their relation to that which they support to the poles and structure of the tent, and the material for covering has been vast sheets of iron. It is quite within the limit of possibility that the return to ropes, to struts, and to sheets, although made of metal instead of hemp, may tend to re-introduce in architecture the curves which result from the use of tension as a method of support. Indeed, we may point to one of our largest and most original modern buildings, in which the tent roof has been actually restored, although in the form of a ceiling instead of in that of a roof. We refer, of course, to the *velarium* or *tentorium* of the Albert Hall.

As the function of the roof, or outer shelter, is to resist the elements, and more especially the wintry elements, in this country, so the function of the ceiling, or interior roof, is to contribute to the comfort of the inmates. The chief material ends attained by a second or inner roof are equality of temperature, acoustic advantage, and diffusion of illumination. Whatever we do by way of decoration ought to be subservient to these ends. In small rooms the latter function of the ceiling, that is to say, illuminative value, is of the most moment. Those of our readers who have made the acquaintance of rooms with papered ceilings, if such papers are of any dusky hue, will be aware of the sombre effect thus given to a house. Bearing in mind what we have recently written as to illumination, we admit into an ordinary sitting-room less than one forty-eighth part of the full atmospheric light that would fall at the same moment on a spot on the roof of the house in which the room is situated. The plane of the glass being on one side of a normal cube, admits one-eighth of the free atmospheric light. If the aperture of the window be one-sixth part of the area of the wall in which it is perforated, we have $\frac{1}{8} \times \frac{1}{6} = \frac{1}{48}$. From this we must take off 10 per cent. for the obstruction afforded by the glass of the window. The small proportion of light thus admitted into the room requires to be made the most of. No element of the internal structure has so much importance here as the ceiling. A perfectly smooth, white, reflective surface is of the utmost value for optical purposes. And we must ascend high in the architectural scale, and have to do with interiors of large size, and intended for special purposes, before any ceiling decoration, unless it be in the form of mouldings immediately above the walls, at the angles of the ceiling, can be anything but a detraction from the true habitability of a room. It is to the reflective surface of the ceiling that we owe the greater part of the diffused light by which we read, and work, and occupy ourselves in the tasks of indoor life. The richly-pargetted ceilings of the Georgian era may be taken as examples of the richest decoration that is not very destructive of light.

When we ascend from the dwelling-house to the public hall, we generally have loftier ceilings with which to deal. The windows are also more lofty, and the direct reflection from the ceiling on the eye plays a less important part in the diffusion of light. In such buildings, too, light is usually here required by the individual. What is most important is, that the speaker, or judge, or clergyman, or singer should be visible, and, above all, should be audible. The illumination of the body of the hall is of less importance; and as, in our actual state of civilisation, a very great portion of our public life is carried on by artificial light, the illuminative function of the ceiling has been often much neglected. In a very large number of buildings of a public nature we thus find that the trabeate form becomes developed to its natural outcome, the panelled roof. Here decoration begins to luxuriate. The panels are deeply recessed. Bold mouldings and central ornaments are thrown out from the surfaces. Gilding is employed to heighten the effect, and the extreme of decorative luxury is reached when painted compartments are framed in gilded mouldings.

The loss of light thus caused is immense. We are supposing that the architect can dispense with a very brilliant interior illumination. Still it is essential for him to know beforehand how much light he shall have. What is lost by shadowy projections, of course, is a matter depending on detail in the individual cases. But we now refer to what is lost by substituting colour for white surface. As to this we may mention one fact, which is highly significant. When the dioptric apparatus for the Wolf Lighthouse, which was completed in 1869, was in preparation, it became important to ascertain

* Among these deserve mention, for their moderate price, the exhibits of Girodias, Hirt, Letellier, Nines, and Petit.

how much light was lost by passing through ruby glass. The investigation was entered on by Professor Tyndall, the scientific adviser of the Trinity House, and it was found that the results could not be determined by ordinary photometric measurements. Observations were made of revolving-lights, showing red flashes, at 2, at 11½, and at 30½ miles' distances. From a comparison of all the practical tests it was determined that the quantity of light to be appropriated to the red beams should be to the white in the ratio of 5·275 to 2·250, or nearly as 21 to 9. That is to say, that in the light reflected from a painted ceiling there is a loss, as compared with reflection from a white ceiling, which will depend on the colouration, but of which the amount may be estimated by knowing how much it is in the case of the pure tint of ruby red.

If we illustrate an argument of this nature by practical examples, we can find no more apt instance than that of the church of La Santa Annunziata at Genoa. We can now only speak from memory, and that not of the most recent date. But we apprehend that this church is one of the most sumptuous specimens of a richly coloured and decorated roof anywhere existing. The architectural lines of the columns, which support semicircular arches, supporting a rich frieze and cornices, are carried across the vaulted ceiling. Gold, carving and gilding, are abundant, and the central compartments are covered with colossal paintings representing scenes in sacred story, which are visible on looking from the western end of the aisle. But this splendour is not confined to the ceiling. The entire church is gorgeous with coloured marbles, and with lavish wealth of ornament. As to observing the paintings as works of art, it is impossible. The painful attitude required for gazing up at the roof forbids any long inspection. But the effect on the visitor is that of a splendid whole. It is quite possible that a plain white ceiling might be out of keeping. There is enough light in the church to show off its splendour, and that is all that is required. In the second edition of his "History of Modern Architecture," Mr. Fergusson says of this church that "the whole is in such good taste, so rich, and so elegant, that it is probably the very best church of its class in Italy." He adds in a note that the whole of the interior has been re-gilt and repainted, and that it is consequently deficient in solemnity, a view with which we quite agree, being "content," as Mr. Fergusson says of two Venetian churches, "to be charmed with the richness of the colouring, and astonished at the wonderful elaboration of the details, without inquiring too closely whether or not it is all in the best taste." In this case, then, it is not a question of the decoration of the roof of a building such as those which we are accustomed to see in this country. It is that of the harmonious treatment of an interior, the great effect produced on entering which is the impression that no wealth is too great to lavish on the adornment of a famous shrine of Catholic worship. As to the *ensemble*, it may be possible to form more than one opinion. But it is as an *ensemble* alone that it can be regarded, and any attempt to transplant a portion of the rich and gorgeous whole to a differently conceived structure could only result in failure.

From examples like that of the Church of the Annunziata, where carved, gilded, and painted ceilings or vaults are in harmony with coloured marbles, richly-adorned altars, abundant votive pictures, lamps of precious metals, waxen tapers in silver candlesticks, gorgeously attired, crowned, and jewelled images of saints, and all that can add to the magnificence which surrounds a pompous ritual, we may draw certain inferences as to roof decoration which are generally applicable. Of these, the first is, that gold and rich colour on the ceiling tend to bring it down to the eye of the spectator. Magnificence is attained, in so far as costliness of material is displayed, but it is at the expense of grandeur. This remark may not apply to roof decoration by projecting mouldings, or receding panels, without the use of gold or of colours. By all forms of decoration of ceiling, indeed, light is lost. But where a "dim, religious light" is suitable to the place and to the habit of the worshippers, it is enough to point out that this loss occurs. It is possible that it is not a disadvantage. So far from there being loss of grandeur or of apparent distance, we apprehend that the reverse is the case with a shadowy or even a dusky roof. As brilliance of definition brings the object apparently closer to the eye, so does indistinct definition tend to remove it. This indistinctness may be created in various ways: by actual shadows, by want of sharpness in lines, or by duskiness of tint. Grandeur and splendour are thus diametrically opposed to one another as effects to be produced by decoration of roof. And good illumination of an interior (without the introduction of artificial light) may be said to be intermediate between the treatment which produces grandeur, and that which produces splendour, of effect.

The traveller who is familiar with Italy will at once remember how very generally colour is introduced even in domestic ceilings. As to this, it has to be borne in mind that under the bright sky of Italy there is a need for subduing the amount of daylight admitted to a house which is rarely, if ever, felt in more northern climates. But the experience of Italian ceilings leads to the remark how inappropriate for decorative use, in this part of the interior, is the human form. We have examples of the work of the greatest masters of drawing and of colouring, in some places, unfortunately spread over ceilings. It is impossible to be familiar with them without regret. The essence of art, the verisimilitude of the object represented, is absent. A perfect master of anatomy may give a tolerably correct representation of the human figure, as it might look if suspended in an impossible position. But he can never be perfectly sure that he is correct,—because he can never check his imagination by observation of a figure in that position. And those who know how different is the representation of a pose or of a movement which the artist has surprised in nature, from that of one in which he has arranged a model, will be aware what this means. Even in the wonderful aërial groups of Correggio, there is always a something to give the idea of an academic *tour de force*. Amoretti or angels, goddesses or saints, the inhabitants of a ceiling to whom human form has been given, have always much of the unreal, if not of the monstrous. A shadowy Night or a cloudy Morning reclining under a pediment, or frowning on a pendentive, offers the nearest approach to the introduction of the human figure on the ceiling that fails to weary, to disappoint, or to disgust. And if that be the case with artists who were consummate anatomists, masters of the art of foreshortening, educated by every day's varying light and shade in a sense of *chiaroscuro*, furnished with experience of at least the semi-nude *ad libitum* for half the sunny year, and practised in the rapid treatment of the *fresco* touch on the admirable plaster of the country,—what is likely to be the case if we employ decorators who cannot hope to unite these advantages, even if they can fully lay claim to the possession of a single one of them? We may refer to a recent instance of ceiling decoration in Paris as somewhat exceptional. Light, shadowy outlines of figures, borrowed from the Greek mythology, have not the ponderous and oppressive effect of solidly coloured human forms. In this instance, however, there is no attempt to carry the architectural lines of the building into the visible under-surfaces of the roof. Although the treatment may be more or less conventionalised, the object of the artist has been to give to the spectator the idea that he is gazing up into the vault of heaven, and that he catches an indistinct glimpse of the inhaitbants of the celestial regions. We cannot venture to offer the opinion that such an effort must necessarily be a failure. But we cannot be wrong in holding that it demands an artistic skill of a nature close upon genius to produce anything but a failure in such an attempt. And we are convinced that that essential characteristic of true poetic treatment, absence of exact or intrusive definition, should be adopted by the decorator in such a case.

There is no doubt that in many of the vaulted roofs of Pointed architecture, the use of colour and of gilding for defining the structural lines of rib and groin was familiar to the early architect. We are not so sure as to the date at which this mode of decoration was chiefly in favour, or as to what led to its decline. From the remains of colour in old churches it is clear that the use of colour in the roof is older than the introduction of the Early English style of Pointed work. The struggle which we have indicated as maintained between splendour and grandeur has probably been carried on, with varying fortune, during the whole period of the Gothic centuries. Indeed, Gothic architecture, pure and simple, may be said to have been absolutely crushed under the weight of the decorative luxury of the latest Perpendicular style. If we look at such roofs as those of King's College Chapel, Cambridge, Henry VII.'s Chapel, Westminster, or St. George's Chapel, Windsor, we find instances of the most costly and laboured negation of the law that structures must control decoration. The idea of these roofs is that of work by magic; to produce an impossible effect; to suspend solid pendants from a carved stone ceiling, instead of to raise a lofty vault on slender shafts, was to emulate the grandeur and simplicity of the sky. There can be no doubt of the high structural skill of the architects of these roofs and of similar structures; but there can be no doubt either that this skill has been directed in a very questionable path. The only natural model that could be mentioned as presented to the mind of the artist by one of these wonderful ceilings is that of the cavern. In a very homogeneous rock it might be possible to decorate a natural roof with the fanwork of Perpendicular tracery. Even here, however, a sense of insecurity would always be awakened. Such a sense is the reverse of that which the true architect seeks to gratify. The ideas of repose, of safety, of adaptation both of material and of design to their true purpose, are the very guiding-lights of the architect. To produce a roof that threatens to crush the spectator, and that actually involves in its form a wholly unnecessary degree of danger, or of labour directed to the express purpose of exciting fear or wonder, may be skill of a high order; but it is not, in our view, the proper skill of the architect. Such roofs may be magnificent, but they are not admirable as specimens of true architectural excellence.

A FAMOUS ROMAN ARSENAL.

"FORUM JULII, a town of Gallia Narbonensis, now Fréjus, in Provence." Such is the short notice devoted in Lemprière's Classical Dictionary to a once famous town, one of the three great arsenals of the Roman Empire, but now a village situated far inland, its streets strewed with Roman ruins, the crumbling remains of past magnificence.

A recent article in the *Revue des Deux Mondes*, from the pen of M. Lentheric, has thrown much light upon the deserted old Roman station, with its interesting history and architecture, which three centuries ago the virtuous and accomplished French Chancellor, Michael de l'Hôpital, described so simply and so truthfully in one of those epistles the Latinity of which the learned have considered even equal to that of Horace.

"We reach Fréjus, which is now but a poor little town. Here are the great ruins of the antique theatre, the arches fallen down, the *thermæ*, the aqueduct, and the scattered remains of the quays and the port, its place only now a beach and fields."

There remains little doubt that the Phœnicians, in the first place, and after them the Greeks from Phocæa, traces of whose existence are found in all the towns of the Ligurian coast, founded at the mouth of the Argens a commercial establishment previously to the Roman occupation. Few vestiges, however, remain, of a period anterior to the Conquest, and the town of Fréjus only comes into notice at the epoch of the Roman colonisation,—that is, about half a century before our era. The great military road made, or rather repaired, by Aurelius Cotta (who gave it his name, the Via Aurelia), issued from Rome by the gate of the Janiculum, on the further side of the Tiber, ran along the Ligurian coast, and ended at Fréjus; there it left the shore, and ran northward to Arles. Fréjus was, therefore, as we see, the last maritime station on this important road, the chief feature of which, as it followed the coast line, consisted in its lying under the protection of the Roman fleet, and affording an open gate upon Gaul.

Irritated as Cæsar was with Marseilles, which had embraced the cause of Pompey against him, the future dictator favoured the creation of a rival to the Phocean city; a vanguard was sent to occupy the little port at the mouth of the Argens, a body of soldiers belonging to the tenth legion, which gave their name to the town, Forum Julii Decumanorum, from which has been corrupted the modern name of Fréjuls or Fréjus, which it bears to this day.

In spite of its advantages as a strategic post, it is certain that Cæsar's choice was, from a nautical point of view, bad. From the earliest times the ancients were aware of the effects produced by rivers which roll down to their

mouth quantities of mud, and the care with which they avoided placing their ports in such positions is constantly to be noticed. Vitruvius, the most experienced of the Romans in matters of construction, speaks of the dangers consequent on a want of consideration given to this point, but though the great architect actually served as a military engineer in the armies of Cæsar, his principles seem little to have been put in practice. The port of Fréjus was, so to speak, decreed by an act of sovereign will; by its very position, bathed on the south by shallow ponds connected with the sea, and on the west by the marshy course of the Argens, where the fleet anchored, the ruin of the port could only be a matter of time.

The space at our disposal forbids our entering into the consideration of the incident of Antony and Lepidus meeting not far from Fréjus, after the murder of Cæsar, for the details of which we would refer the classical student to the original pages of the *Revue* for the two letters from Lepidus and Plancus to Cicero; their chief interest lies in the fact that they settle indubitably the position of Lepidus's *castrum*, or camp, on the plateau of Châteauneuf. The bridge of Argens, the scene of the defection of Lepidus, some thirty years ago was still in existence, but its three unequal arches have since been carried away by a flood. The bridge of the modern road, which passes only a few yards distant, has taken its name, *Pont d'Argens*, and there alone now remain of one of the oldest works of the Aurelian Way some still recognisable remains of the abutments, and a few mutilated inscriptions found among the ruins.

Fréjus was not an ordinary colony; and though there are to be found remains of the usual features of Classic official architecture, an amphitheatre, forum, thermæ, &c., Fréjus was principally an arsenal and a garrison town for the crews of the Roman fleet. Rome became a maritime power merely by the force of circumstances. It was alone when they resolved to drive out the Carthaginians from Sicily, that the Romans constructed, in an incredibly short space of time, a fleet, the ships of which were copied, more or less it is said, from the skeleton of one of the enemy's galleys wrecked on the coast of Latinum. But the Romans were never anything but bad naval engineers, and very poor sailors.

Their vessels belonged nearly all to the class called *onerariæ navæ*. They were merely transport ships, chiefly manœuvred with the oar, and capable of holding arms, provisions, men, and even horses; they were therefore heavy, and by no means easy to manage in a bad sea. These vessels, armed with spurs and grappling-irons, resolutely hooked themselves on to the enemy's ships, and, once the two were locked, the battle was decided, not by naval tactics, but by the strength and bravery of the soldiers, who fought by the same rules as those employed on land.

We know that the ancient ships were often hauled on shore during the night by means of capstans,* for the practice of anchoring in the roadstead was unknown, and the Roman sailors alone felt in safety when their vessels were hauled up high and dry on the shore. The fleet, arrived in port, was dragged up inclined planes on stocks specially for that purpose, or even upon the shore, as is still practised all along the Mediterranean; nor does this primitive process, dating from the time of Homer, appear to have received any modification during the Roman rule.

As conquest had given their rule a development of coast line such as no nation has probably ever possessed (save England), it was indispensable for the Romans to keep a fleet to exercise a watch over this immense line. Thus there were three fleets: one in the Adriatic, the other in the Tyrrhenian Sea, the third to guard the coasts of Narbonne and Iberia, or Spain. Each of these fleets had its arsenal. The first was at Ravenna, the second at Misenum (the upper extremity of the bay of Naples), the third at Fréjus, which was the rallying-point of the squadron entrusted with the protection of the coast of Gaul and Spain. If we are to judge by Tacitus, Fréjus was the most important of the three, for there it was that the conqueror of Antony sent the ships of war he had captured at the fight of Actium, and which he justly considered as the most glorious trophy of his victories.

* A custom still observed in all fishing villages on the coasts of France and England, where the antique capstans form no inconsiderable portion of the picturesque effect of the sea-shore.

It is not our intention to describe in detail the monuments of Fréjus, an interesting task which, as M. Lentheric very truly observes, would in itself require a volume. The study has been made more than once with care and talent, and we cannot do better than refer those interested to the valuable monographs that within the last half-century have been published on the subject, by M. Chas. Texier and others. There will be found, treated at length and illustrated by numerous plates, the complete restoration of all the monuments of the antique town, the citadel, and the jetty, the warehouses, the depôts, the signal towers, the gates and walls, the market, the thermæ, the theatre, the amphitheatre, the temples, the forum, the drains, the aqueducts, &c. We must content ourselves with a glance only at the interesting colony in its whole, and in some of its salient features.

We know that in the organisation of their conquered provinces the Romans pursued a double aim, to create a strong power which would insure them against the chance of a revolt, and at the same time to establish an administration as simple and as easy as possible. This system received a different application in each province, according to the nature of the place, the inhabitants, the state of their civilisation, and the circumstances of their conquest.

On those people conquered by force, whose land had been adjudged to the *ager publicus*, the Roman colony was imposed,—a semi-civil, semi-military institution, founded in principle on the expropriation of the old inhabitants, and the foundation of a little Rome in the midst of the vanquished people. Then came the Latin city, into which came those who had submitted to the Roman yoke; then those who paid an annual tribute, hence termed *stipendarii*. Such was the system constantly employed during the republic and the best days of the empire; it presented many advantages, and the governor of the province, leaving to the magistrates of the towns the details of the administration, could with greater ease look to the general interests of his charge.

The monuments of Fréjus point to the probability that from an early date it was one of the most favoured colonies; at the same time, a civil and a military colony. So successfully had the Romans carried out their system, that, if we are to believe Pliny, the Narbonnaise, comprising the whole maritime country from the Alps to the Pyrenees, had become so Roman that it was scarcely distinguished from Italy. No people certainly have possessed in so marked a degree the genius of administrative colonisation, which nowhere produced results more rapid and more complete than in Fréjus, and it is impossible not to admire the surety of method, the practical spirit, and the simplicity of the material means of execution which brought about, almost at a signal, the disappearance of the Græco-barbarous city, and improvised, in the short space of a few years, an absolutely new city traced on the model of the metropolis, and the machinery of which was able to work with regularity in its smallest details the marrow of its establishment.

In general a somewhat false idea is formed of the methods employed by the Romans in the innumerable constructions with which they have covered the soil of their immense empire. We have been led to believe that the Romans wished to give systematically to all their monuments a strong character of vigour and a majestic architecture. Nothing is less exact, and a recent study by M. Choisy (an engineer) on the art of building among the Romans (*L'Art de bâtir chez les Romains*) allows of our observing their processes of construction and the organisation of their yards in their smallest details. The Romans had not in reality an architecture which was strictly their own. The principal elements of all their edifices was the arch and the vault, which they had borrowed from the Etruscans. It is from them also that they adopted their enormous blocks, dressed without cement, and which distinguished the greater part of the monuments of the republic. This method of building, in which each stone impresses one with the idea of a difficulty overcome, suited too well the expression of their power to be abandoned in the days when Rome reached the pinnacle of its grandeur, and so we find it used at all the periods of her history. The columns of granite erected in the monuments of the empire, the monoliths, heavy and massive as Egyptian obelisks, from which the spring of the huge arches, the quarters of hewn rock which form the Roman amphitheatres, all the pompous ornaments which the architects of the later times applied to their great edifices, show sufficiently, in spite of the difference of styles, that the Roman builders never entirely forgot the antique traditions taken from the school of the Etruscan masters. But the essentially practical spirit of the Romans, their instinctive taste for the simple and the useful, urged them soon to employ in their public buildings processes of execution more economical, and especially more rapid. Already, with the end of the republic, the embellishments of Rome, undertaken with a feverish activity, were only used as a means to make the people forget its old political life, and the city of the seven hills was covered, under Agrippa, with edifices consecrated to the pleasures and the holidays of the multitude. The colonies only reflected the metropolis, and the same activity was displayed in the construction of the same edifices; everywhere the same discipline, the same rapidity of execution, facilitated by the resources of labour, gratuitous, and almost inexhaustible.

It was, indeed, a principle at Rome that the soldier should never, in any case, remain unoccupied; and in employing him in works of construction, he was preserved from dangerous idleness. Frequently the Roman troops were thus employed in works which were almost superfluous. When Vitellius caused to be erected by his soldiers the amphitheatres in the cities of Bologna and Cremona, he thought less, so Tacitus tells us, of endowing the two towns with useful monuments than of diverting for a moment the turbulent spirit of the legions. From a like reason we see the Roman soldiers building amphitheatres in Africa, defensive walls in Brittany (doubtless also the Roman wall which divided Scotland and England—"Hadrian's wall" was built under the same conditions); in Egypt, tombs, bridges, temples, porticoes, and basilicas; in Italy they made the great roads; almost everywhere the mention of their work is accompanied by the curious observation "that the monuments were undertaken to occupy the leisure of the soldiers."

It was not alone the soldiers who were transformed into builders; such was the simplicity of the processes employed that they could be applied even by the prisoners whom the Romans kept at their discretion, as also by the convicts, who sprang from the lowest ranks. Condemnation to public work was indeed among the penalties of the law, and one of its chief duties consisted in quarrying the building material.*

But in the provinces, at moments of haste, free men were often called upon to be builders. The types of construction were very simple and always the same; intelligence in the workman was almost unnecessary, numbers replaced its want, and every able-bodied man, soldier, prisoner-of-war, slave, convict, and free man, helped in the public works. The management of this huge band of workmen required merely organisation and discipline. The consequence of such a system was the natural abandonment in most cases of any architectural dispositions requiring not alone time, but especially skilled hands, and it was alone in exceptional circumstances, when the proximity of the quarries allowed of the easy transport of material, that the enormous blocks of stone were used; such, for example, may be seen at the Pont du Gard or in the arenas of Nîmes. Almost everywhere these buildings were made of small materials connected by mortar, such as bricks and concrete masonry, which required on the part of the workmen no talent or special education.

The antique town of Fréjus is a striking example of these processes of rapid execution. All the edifices of the city, the walls, the quays, and the port, were built at the same period, by the same workmen, with the same materials, cut in the same proportions and laid in a similar manner. Though the neighbouring mountains would have supplied excellent building materials, time and special workmen would have been necessary, and with the exception of the columns, and the ornaments in marble, serpentine and porphyry remains of which are found, the city was built of brick and small rubble. Everywhere, also, where the rock crops out, it has been utilised, and in the amphitheatre one-half is formed of a rocky matter of volcanic origin, a condition found also in the walls of the city; everywhere are evident haste, and a desire to make use of any natural advantages, without the slightest effort in the direction of originality or ornamentation.

* See A. Choisy, "L'Art de bâtir chez les Romains."

Fréjus, surrounded by brackish water, had to be supplied with drinking-water,—a necessity of the first order with the Romans; the distance of the source mattered little, and so it was that the Siogne, a small river nearly forty miles from Fréjus, was utilised, and an aqueduct built, traversing more than one chain of hills and valleys, and remains of which still lie stretched for many a mile; from these ruins it is evident that this aqueduct was the most extensive and monumental which the Romans established in the Narbonnaise. Thousands of workmen must have been employed, and evidently the same as those used in the construction of the city, for the same materials, the same haste in execution, are observable, a fact which led to the invariable result accompanying carelessness, for remains are still apparent of later reparations.

The only monuments of Fréjus which differ from the familiar types reproduced by the Romans in all their colonies are those connected with the port. The quays and jetties are still apparent to the south of the town, in the low, flat plain of sandy alluvium traversed by the railway line from Toulon to Nice. At the extremity of the chief jetty may still be seen in a perfect state of preservation a singular monument, the circular base of which is surmounted by a six-sided prism, crowned by a hexagonal pyramid. The primitive destination of this tower has given rise to many conjectures; the most probable of these make of it a signal-tower, and perhaps the faces of the prism were utilised, like those of the famous Tower of the Winds at Athens, as sun-dials, while a staff or vane served to indicate the direction of the wind, or to give signals for the manœuvres of the entry to the port. In every case it is evident that the tower was not a *phare* or lighthouse. The true *phare* of Fréjus was opposite. Like all monuments of this nature, it resembled the famous edifice erected to the entry of the port of Alexandria. Every one knows that that prodigious monument was built on the little island of Pharos (whence it took its name φαρος, still retained in the French word *phare*), and which, ruined by an earthquake in 1302, only remains a shapeless ruin. All the beacons or lighthouses of antiquity were built upon the model of this marvel of the ancient world. Such, for example, was that which Caligula built at Boulogne in his foolish expedition, when he approached our shores with such an alarming number of warlike engines. According to the drawing preserved by the Dominican Lequieu, it was composed of no fewer than twelve stories. The building was composed of stones of different colours, alternating with chains of bricks. Such was the picturesque tower which Charlemagne restored, and with it its old lamp, extinguished for many centuries, and the tower, the *Tour de l'Ordre*, which, in 1545, while our English arms still occupied Boulogne, was taken inside the fortifications and converted into a dungeon. Tower and fort crumbled away in 1684.

In its construction the Pharos of Fréjus resembled that of the famous beacon-tower of Alexandria, and like that marvel of Sostratus's architectural powers, and the beacons at Ostia and Boulogne, had several stories, occupied by the *cohortes vigilum*; half a century since, much of the old tower was still erect, but now time has worked its effects, and restoration is almost impossible.

Not far from the Pharos may still be seen the gate known as the *porte dorée*; executed with much greater care than the other buildings of Fréjus, it is evidently of a later period, and appears, from the remains of marble and fragments of statues found at its base, to have been highly ornamented. In the midst of the scattered ruins, the *porte dorée* stands alone; the burning sun of the south has tinged it with so glowing a colour that the brush could with difficulty render it faithfully without being accused of exaggeration. Is it from this reason, or because of the golden riches that passed through it in the past, that it bears its name the *porta aurea?*

One of the questions which always suggest themselves at the sight of the ruins of an antique city is, what was its population? Two elements allow of an approximative calculation; the perimeter of the walls, and the size of the amphitheatre. Free as these latter places of amusement were, it has often been proposed to calculate the figure of the population at double the capacity of the theatre; in this way we have arrived at something like the population of most of the towns of the Narbonnaise, Narbonne, Nimes, and Arles.

While the amphitheatre at Nimes was able to contain some 25,000 spectators, according to the restorations of M. Charles Texier that at Fréjus could only have contained about 10,000,—at the utmost, 12,000. Hence we arrive at the approximative figures of 20,000 to 25,000 for the population of antique Fréjus, a calculation confirmed by the capacities of the walled-in space of the city fortifications.

Situated as Fréjus was, at the mouth of the muddy Argens, its fate was doomed. As long as the empire flourished, the dredging of the port was carefully maintained, and the three or four yards' depth necessary in the channel for the vessels of those days was easily insured. With the fifth century, and the arrival of the barbarians, the port was neglected; the Saracen invasion still further ruined the country; the amphitheatre was transformed into a stronghold, and when in the tenth century the Christian bishops re-walled-in the city, many of the Roman buildings were destroyed for their material. The port had already filled up. Like Ostia, Ravenna, Narbonne, and Aigues-Martes, Cæsar's port suffered the same fate; a low marshy plain cuts the village off from the sea, and the only future that remains for Fréjus is to cultivate the site where eighteen centuries ago proudly rode the three hundred galleys conquered by Octavius at the famous fight of Actium.

Few regions of Provence are more delightful for their scenery and climate. The little town of Saint-Raphael is placed outside the zone of infection of the marshes of Fréjus. It extends gracefully on the shore at the foot of the wild chain of the Esterel. On every side the peaked rocks of red porphyry glance through the thick foliage of the pine and the cork trees. In the distance Fréjus, deserted and sad, lies in mournful solitude. The veil of death seems already to have covered the silent, sleeping country side. The broad plain of the Argens stretches out green and feverish; the ruins of the aqueduct stand out on the horizon, lost in the distance of the valley, and recalling the long lines of arches and pillars of the deserted Campania of the Eternal City. This southern landscape is far more Italian, in the classic sense of that word, than even many famous sites in Italy. It is the same soil, the same sky, the same sadness as on the banks of the Tiber. The Roman remains scattered on every side render the analogy even more striking. The port of Cæsar and Augustus recalls in many of its features the vicissitudes, the prosperity, and the ruins of imperial Ostia.

ELEEMOSYNARY ART.

THE taste for art has been gradually becoming, in this country, less of an aristocratic privilege than it used to be, partly keeping in pace in this respect with the great social change in the relative power of "family" and money in conferring social distinction. For until a very recent period, taste in art has certainly been an aristocratic privilege, even in times and under governments which were nominally democratic. The writer of a recent clever and piquant magazine article on "Art and Democracy" has observed, truly enough, that in the great days of Florentine art, in spite of the assumed democratic constitution of the State, the art patronage was all on the part of the wealthy and cultured leaders of society, of whom the Medici were the most notable types, and who were really an aristocracy, and an aristocracy of a very "exclusive" kind, to use a favourite expression of our American cousins. There is little evidence of any enlightened interest in art on the part of the many even in that day; and it is probably well for us, who inherit the works of the great artists of the period, that there was not, and that the public to whom they really appealed, though a limited one in regard to numbers, was composed of the persons who represented the most cultured, exacting, and sensitive taste of the age: people with all the selfishness and class prejudice, and other faults usually found to accompany an aristocratic caste, but having also, in an unusual degree, the intellectual refinement and delicacy of perception in regard to æsthetic which perhaps can hardly be attained except in a society accustomed to a luxurious and refined social atmosphere, possessed of the wealth which gives the means for the collection of beautiful surroundings, and the inherited and highly-developed taste which prompts the desire for them, and gives the facilities for fully appreciating them. The most marked feature in the art patronage of the present moment in England is that to a considerable extent the wealth, and consequently the power of commanding costly artistic production, has passed into the hands of a different set of people. According to the writer before mentioned,* the modern representatives of the art patron, the men who are to England what the Medici were to Florence, are "navvies who have made money"; and he attributes to this fact a great deal of the realistic and prosaic tendency of the art of the present day in England, which has to please patrons who have not inherited high culture or the sympathy with a refined ideal. There may be something in this idea, though it is rather contradicted by the fact that it is this very class of *nouveaux riches* who are the most enthusiastic patrons and liberal purchasers of the works of that small group of artists who specially profess to follow the ideal in art, such as Mr. Rossetti and Mr. Burne Jones. Whether the correct inference from this is, that the *nouveaux riches* have really a more refined and ideal taste than they have been credited with, or that the ideal of the painters in question is not so very ideal after all, or that the buyers follow a fashion, might be a profitable subject of discussion, which, however, we pass over just now. What we are specially remarking is the fact that art-patronage has taken of late a decidedly democratic turn.

It is, perhaps, partly the development of this taste for art on the part of the man who has made money (it would be more correct to say, perhaps, on the part of his sons and heirs) which has suggested a movement that is obviously going on for giving art to the many who have not made money. The desire to cultivate a taste for art on the part of the humbler working class of the population is, of course, not so new; it has been an aim with ourselves for long enough, as far as opportunity admitted, and no sensible person, we presume, questions its desirability. But progress is certainly slow in this direction. To awaken any desire for or interest in beautiful things for their own sake, in the mind of men of little education and engaged in a hard struggle for existence, is a work of time; and though the existence of the wish is the first and most important step towards the supply of the want, there is still the question, if you can implant in the labourer a desire for artistic embellishment of his life, how is he to gratify it? Art, after all, costs money, and he has, or says he has, none to spare. On holidays he has those art-galleries which are free to all, but these, even if understood and appreciated, do not affect his daily life. The better education which the next generation of the poor will probably have had will enable them to see better how to make their homes brighter and more attractive than they are now, even at little cost. The present generation can hardly, perhaps, have time to learn it, or opportunity to provide for it.

It is something like this line of argument, we may suppose, expressed or understood, which has given rise to various attempts at what we have called eleemosynary art. The working man and his family either will not or cannot get art, therefore art must be given to them. This is the object of not a few private and individual attempts, and of at least one constituted society (whose last annual report is now before us) with committee, secretaries, and other staff organisation in the usual form. Ladies are constantly found engaged on ornamental needlework which is to be presented to some *protégé* (or *gée*) who cannot afford to pay for anything merely ornamental; or they are painting the panels of the cupboards in the parish school-rooms with conventional foliage, or doing frescoes on the walls of the working-men's club. The Kyrle society, above referred to, is decorating the wards of hospitals and the walls of churches in poor districts, and in its last report requests subscriptions for adding various items of specified decoration to a new block of model dwellings; decorations which considerations of sound economy and a proper return for outlay prevent the promoters of the scheme from entertaining on their own account, but which they presumably are quite willing to see added—as a contribution at the hands of others. There are so many stone brackets, for example, which must be left plain if the builder's contract is to be kept within the mark, but each of which can for a certain sum be carved with foliage or other adornment, and

* See the *Cornhill Magazine* for August.

charitably-minded persons are invited to contribute that sum; and so on through other items.

There is excellent feeling about all this, and if charity (in the sense of giving) is to exist at all, perhaps it could hardly exist in a form which seems more graceful. But there certainly are two sides to it, and we are led, while recognising the kindly spirit which actuates such an undertaking, to ask, is it sound? or is it not in reality more creditable to the hearts than the heads of those who are endeavouring to carry it out? In the case of hospitals which are "supported by voluntary contributions" (as too many are), there is certainly something in a gift of this kind which is not out of keeping with the general relation of such an establishment to public aid. People who have little means, but who possess some artistic ability, may not unreasonably say, in the apostolic phrase, "Silver and gold have I none, but such as I have give I unto thee"; I cannot afford a large subscription in money, but I will expend some of my ability in decorating the rooms where your patients lie, and making them look more cheerful. This is especially a suitable position for people with artistic talent, which they exercise only as amateurs, who may by this means turn what would otherwise be a pursuit merely for their own gratification into a gratification for others. But when the decoration thus carried out is the work of or the design of people who are professionally engaged in that class of design, as architects or decorative artists, it is difficult to see on what grounds of general justice such persons should be expected to give time and ability, which are part of their daily bread, to the extent which is sometimes asked from them, and apparently complied with. A professional man with a moderate income, who would feel it most unreasonable if he were asked to subscribe more than two or three guineas towards the general working expenses of a "voluntary contribution" hospital, gives time and work worth perhaps ten or twenty times that sum, towards an ornamental contribution. It is very good-natured of him to do so, but we see no sense or justice in amateur philanthropists expecting him to do it: nor do we quite see on what grounds the very persons who are most opposed to ordinary "charity" in the sense of money and soup, from a conviction of the ill effects of "pauperising," should be so active in giving away art. Decoration costs money, just like soup and blankets, and (unless in exceptional cases) it seems to us that those who want it should pay for it. And, in fine, if the principle of providing people with art *gratis* is once admitted, where is it (logically) to stop?

FROM THE BANKS OF THE SEINE.

Coincidentally with the forty-first meeting at Sheffield of our own British Association, the French Association for the Advancement of the Sciences has held its eighth annual congress. It is at Montpellier that the association has met this year, and the old scientific capital of the South of France has determined to show itself worthy of its antique reputation. By a fortunate coincidence, the prefect of L'Herault, M. Cazelles, is himself a scientific man, and it is to him that the French owe a knowledge of our sturdy English contemporary school of philosophy through his translation of the works of Herbert Spencer. The labours of the Association this year comprise the fifteen sections of mathematics and mechanics, navigation, civil and military engineering, physics, chemistry, meteorology, geology, botany, zoology, anthropology, agriculture, geography, and political economy; among the papers already read, there have been not a few of more than passing interest. In the geographical section, M. Paul Soleillet, the intrepid traveller, treated the question of the fertilisation of the Sahara, and M. Bardoux, the Secretary-General of the Association and Minister, delivered an important speech on the burning question of education, which has already attracted no little attention from the European press. For the public, to whom the interest of the scientific discussions was unattractive, a superb horticultural show was prepared, in conjunction with which a visit was made to the Mas de las Sorres (Montpellier is not far from the borders of Spain), where are being carried out researches on the vine malady, the dreaded phylloxera. Several interesting manufactories were visited, and an excursion made to the Classic town of Nimes, with its characteristic and familiar features, and to the equally classic town of Aigues-Martes. A number of foreign savants are reported as being present, the name of Dr. Hogg, of the Royal Horticultural Society, being conspicuous among the English visitors. An important question was treated early in the meeting, in the remarks of M. Trelat, the director of the Ecole d'Architecture," of Paris, on the hygiene of the schoolroom; M. Trelat skilfully showed the value of the question, and the conditions necessary to the ample supply of light, space, air, and cleanliness, all subjects clearly developed, as also the most approved method of admitting light into the class-room. The Panama canal scheme does not appear to have monopolised the attention of the engineering world, but on the evening of the first day's meeting the long-talked-of project of the canal of irrigation of the Rhone received warm discussion. It would appear that the great plains of Languedoc are deprived of water, and hence the inhabitants suffer from deficient crops. This would be remedied by the adoption of the canal of Dumont, its first promoter. The mention of Dumont's canal suggests the appearance of a new periodical, directed by M. Ferdinand de Lesseps, and destined to defend the new enterprise of the man whom Gambetta once justly termed "the great Frenchman." M. de Lesseps is in no way discouraged, and in the first number of this new publication the eminent engineer sets forth with praiseworthy clearness the advantage which will result from the piercing of the American isthmus. The pages of his journal are further intended to be open for the discussion of all objections.

With these declining days of the summer, even in writing from the banks of the Seine, one seems destined to have to be carried away from the city of which Lord Beaconsfield, through one of his heroes, once remarked, that in aping imperial Rome, Paris might share its catastrophe. Carried far south to the classic city of Montpellier by the doings of the French Association, how is it possible not to link the name of that famous university town with that of François Rabelais, for the purpose of erecting a statue to whose memory a subscription is at present on foot? This statue will be set up in the birthplace of him who has been called the Democritus of France, at the quiet little Touraine town of Chinon, the picturesque town where took place the meeting of Charles VII. and the unfortunate Joan of Arc. It is only surprising that so many years should have passed away before the birthplace of the great author of "Gargantua" should be so suitably adorned. At last the good-humoured Franciscan, who took his first degree in the faculty of medicine at Montpellier, will be honoured as he should be; the child of that strange and tumultuous sixteenth century, who may be placed foremost among the originators of the existing French language, will at last have justice done to him. Let us hope that the sculptor may be impressed with the importance of his task, and create a satisfactory realisation of the jovial-minded curé of Meudon, from whose richly-embroidered writings old Burton, in his "Anatomy of Melancholy," drew such stores, and after him irreverent Swift and tender-minded Sterne, and even in our own days Southey, in that singular creation, "The Doctor." For the fortunate sculptor there will be no want of figured portraits of Rabelais, though discrimination will be absolutely necessary. Hopwood has engraved, for instance, from a miniature in the Bibliothèque Nationale here, a portrait, in profile, with the familiar flat cap of the sixteenth-century scholar, the features marked and characteristic. In M. Lenoir's collection there was a pencil drawing said to be by Janet Clouet, representing Rabelais at a later period, and a front view; this portrait has been lithographed by M. Prieur; while in the Orleans Museum exists a portrait of the author of "Pantagruel," said to be by Holbein. As for the other portraits of Rabelais, they are chiefly characterless creations of the seventeenth and eighteenth centuries, copied from a mezzotint by Jean Sarrabat. Michael Lasne also has engraved a portrait of Rabelais; but to mention all the other representations of the *protégé* of Cardinal du Bellay would occupy more space than is at our disposition. Good-hearted old Sir Thomas Urquhart will turn in his grave when he hears how at last Rabelais has been honoured as he deserved; and now, why should not the Royalist old Scotchman have a statue too, at least a bust, as the prince of translators?

The South of France is attracting more than usual share of notice just at the present moment. The interesting town of Vienne, where only so short a time ago was discovered the beautiful crouching Venus which has recently enriched the Louvre with a formidable rival to "Notre Dame de Milo," has been chosen as the site of the forty-sixth annual congress of the French Archæological Society, the programme of whose meetings was detailed in last week's issue. The congress was brilliantly opened on the 2nd inst. in the midst of a large crowd of *savants* and archæologists. M. Le Blanc read a paper on the valuable discoveries made within the last forty years in the town of Vienne. Among these discoveries the congress particularly admired the head of a statue in wood,—a unique monument, it would appear. Some curious details were given by M. Recamier on the circus races and the disposition of "La Spina" at Vienne. On the subject of the Roman pottery a valuable paper was read, as also one on the Roman roads of the province. After a number of other important communications, the congress visited the chief monuments of the town, and the interesting basilica which has recently been discovered in digging the foundations of a drain in the neighbourhood of the ancient cathedral of St. Maurice.

It is not alone on the banks of the Thames, or on those of the Seine, that the archæological autumn manœuvres are being warmly conducted; from the banks of the Rhine we learn that the general assembly of the German Historical and Antiquarian or Archæological Society will meet from the 14th to the 18th inst. at Landshut, in Bavaria, when the congress will consider a number of interesting questions; among these, the Roman and Mediæval antiquities of Landshut, and other portions of this corner of Bavaria. The unfortunate English archæologist who in the warmth of his enthusiasm may at one period of life have burdened himself with the possession of more than one foreign tongue, will, indeed, have enough to do in the long winter evenings to read the transactions of the 1879 campaign of his brethren of France and Germany; indeed, we might picture him, when the present season is terminated, much in the position in which Leech placed the Prime Minister in the imagined *far niente* of recess, surrounded by piles of littered papers, while the domestic is seen in the background bearing in a trayful of fresh documents for perusal.

WAPPING IMPROVEMENTS.

The second bridge over the entrance to the London Docks has just been commenced. The works will for a time cause some inconvenience to the local traffic, which will have to be diverted by way of Gravel-lane. A temporary bridge for foot-passengers has been constructed of wrought-iron, with horizontal movement to draw backwards and forwards so as to allow of the docking of vessels. The length is about 60 ft. over all. The new permanent swing-bridge will be similar to that over the Hermitage Dock entrance, with a width of 24 ft. 6 in., and foot-paths on either side, thus avoiding the block to the traffic which formerly existed for hours at a time, and at the most important part of the day. The solidity of the bridge may be judged when the test required is to be 32 tons weight carried on a truck of four wheels. The contractor is Mr. W. Webster, who is bound to complete the work within a given time, and, to show the earnestness with which it has been commenced, the old bridge has been entirely broken up and cleared away. The ironwork is to be erected by Messrs. Handyside & Co., of Derby, and the superintendent is Mr. Rowell. The completion of the works is anxiously desired by the wharfingers and carmen.

Science and Art Examinations.—The circumstances arising out of the "Goffin case" have induced the Lords of the Committee of Council of Education to issue a circular calling the attention of local committees of science and art schools to the fact that the duties undertaken by them are a serious reality, and involve grave responsibility, public money being paid on the faith of their certificate that it has been properly earned. The committee think that further precautions are necessary, and these are now under consideration. A change has already been made by which the period between the reception of the examination papers by the secretaries of the local committees and the examination itself is considerably diminished.

THE LATE MR. EDWARD BLORE, ARCHITECT.

We have to record the death of Mr. Edward Blore, D.C.L., F.R.S., F.S.A., &c., who expired at his residence, No. 4, Manchester-square, on Thursday, September 4th, after a long and painful illness, within a few days of completing his ninetieth year. Born at Derby on September 13th, 1789, he was the eldest son of Thomas Blore, F.S.A., member of the Middle Temple, well known as the historian of Rutland, and author of other works. His early days were spent at Stamford, and he very soon evinced that love for ecclesiastical and domestic architecture which distinguished him in after-life. When quite a lad he used to walk about the country sketching the churches and other objects of interest in the vicinity of his home, and before he had attained the age of twenty, he had executed the original drawings for the illustrations of the "History of Rutland," the second part of which was published in the year 1811. The excellence and accuracy of these drawings brought him prominently forward as a draughtsman, and during the next few years he was engaged by Mr. Surtees, of Mainsforth, to execute the original drawings for the architectural plates in the "History and Antiquities of Durham"; also by John Britton to make the sketches of York and Peterborough in his series of "English Cathedrals"; many of the engravings in Clutterbuck's "History of Hertfordshire" were also copied from his drawings. While still a young man he became acquainted with the many eminent men who at this time constituted the leading society in Edinburgh, and before long he was introduced to Sir Walter, then Mr. Scott, with whom he became intimately acquainted, and a mutual friendship sprang up between them, which was only terminated by Sir Walter's death. At the time of their first meeting in 1816 Scott was anxious to build a new house at Abbotsford in the Gothic style, but was unable to find any architect who could at all comprehend his views. Mr. Blore, however, on being invited to do so, there and then made a hasty sketch, with which Scott was so delighted that he at once employed him to make the designs for the exterior of the building, and these were duly carried out, and the house, as it now exists, remains as a specimen of one of Mr. Blore's earliest works. The satisfaction which the work afforded to Sir Walter, and the general esteem in which he held Mr. Blore, is well exemplified in many of his letters published in Lockhart's "Life of Scott." Mr. Blore was also intimately associated with Scott in the management of the beautiful work, entitled "The Provincial Antiquities and Picturesque Scenery of Scotland," which was intended to illustrate all the chief objects of interest in Scotland; but after two volumes had been published in 1826 the scheme had to be abandoned, owing to the great expense of the work and to the failing health of Sir Walter Scott, who had given his valuable services as editor without accepting any remuneration. Mr. Blore executed most of the architectural drawings; and those of Dalmeny and Roslin churches, some of which he also himself engraved, will compare favourably with anything of the kind which has ever been published. In this work he was associated with Turner, Nasmyth, Calcott, the Rev. J. Thomson, and many other distinguished artists of the day. In this same year, Mr. Blore brought out a work on the "Monumental Remains of Noble and Eminent Persons," containing illustrations of some of the finest examples of the monuments and effigies in England and Scotland from the end of the thirteenth century down to the period of the Reformation. He was one of the first to stimulate the revival of taste for Gothic architecture, which had languished since the time of the Reformation, and he was in constant communication with Rickman, then a clerk in a Liverpool house, on this subject.

Though Mr. Blore flourished before the great tide of church restoration set in, he carried out many works which would be considered highly creditable at the present day. One of his largest undertakings was in connexion with Peterborough Cathedral, where, besides numerous structural repairs, he designed the present organ-screen and choir fittings. So far had the arts in connexion with this kind of work been lost that he had to find out intelligent masons and carpenters, and personally instruct them in the work they had to carry out. Another of his works was the restoration of Glasgow Cathedral, and at Ely and Winchester cathedrals his services were also called into requisition. He also carried out the necessary repairs at Merton College Chapel, Oxford; at the churches of Barfreston, Kent; Thorney, Cambridgeshire; Ramsey, Huntingdonshire; and several others. The beautiful monument to W. Hilton, R.A., on the south side of the altar of Lincoln Cathedral, was from his design, as was also the font with rich tabernacle cover in the Royal Savoy Chapel, and this was the last of his professional works. Under Archbishop Howley he was employed in making extensive alterations at Lambeth Palace, and at this time the residential portion of the palace was entirely rebuilt, while the chapel and hall were restored. His practice as an architect had now become most extensive, and he was engaged in all parts of the United Kingdom, many of the most important houses now existing having been built or reconstructed by him. The magnificent Palace of Aloupka in the Crimea may be specially mentioned as having been erected for Prince Woronzow entirely from his designs. Worsley Hall, Lancashire; Haveringland Hall, Norfolk; Cranford Hall, Dorset; Pull Court, Worcestershire; the Frythe, Hertfordshire; and Crum Castle, Ireland, are among his more important works, a full list of which we hope shortly to be able to publish. He also made extensive alterations at Crewe Hall, Cheshire; the Grove, Watford, Herts; Wadham and St. John's Colleges, Oxford; and others. He soon came under the notice of King William IV., and was appointed by him special architect to his Majesty, and this honour was continued to him by her Majesty Queen Victoria during the early part of her reign. He executed numerous works at Windsor Castle, and undertook to complete for 100,000*l.* the building of Buckingham Palace, which had been commenced by Nash. In this undertaking he had considerable difficulties to contend with, as, on the one hand, H.R.H. Prince Albert was most anxious that the work should be completed as soon as possible, while, on the other, the necessary funds for carrying on the building were somewhat tardily voted by the Government. The whole front towards the Green Park and Buckingham Palace-road is his work, and he succeeded in carrying it out for less than the estimated sum. So well was his conduct appreciated that he was at this time offered the honour of knighthood, which, however, he thought proper to decline. About this time he was appointed architect to Westminster Abbey, a post which he filled for many years, and in which he was succeeded by the late Sir Gilbert Scott, at the time when he finally retired from the profession. As a recognition of the eminent position he held in his profession, he had the honorary degree of D.C.L. conferred upon him at Oxford in 1834, and it was on this same occasion that the first Duke of Wellington was installed as Chancellor of the University.

Mr. Blore was distinguished in his profession as an admirable draughtsman, and he has left behind him a remarkable collection of sketches of churches, castles, and other objects of antiquity, mainly in England, the result of more than seventy years' labour. The only other collection which can be compared with this, as far as is known, is that made by his friend, the late Mr. Twopenny, which has been bequeathed to the British Museum. Mr. Blore was possessed of indefatigable energy, and never missed an opportunity of sketching any object of interest he might meet with. Most of his drawings are of special value, as they were made before the present rage for restoration set in. In many instances they are the only memorials of buildings long since swept away, and many were the occasions when he would travel long distances to obtain a sketch of a church or other building which he had heard was about to be destroyed. His collection of drawings of ancient monuments is especially complete, and he recently furnished a list of the monuments of royal and eminent personages still existing to the Parliamentary Committee appointed to inquire into the subject. His knowledge of heraldry enabled him to identify from the armorial bearings many monuments, the traditions belonging to which had long been lost. As might be expected, during his sketching excursions he often met with amusing and sometimes unpleasant adventures. On one occasion, at Heckington, in Lincolnshire, he was accidentally locked up in the church all night, having been left sketching the Easter Sepulchre by candle-light, and there forgotten by the clerk, who had promised to come to release him. Even within the last five years he had made numerous additions to his collection, and almost up to the time of his death, he was engaged in finishing drawings from memoranda he had jotted down at the time of his visits to the various places. He was also engaged during the present year in collecting together various anecdotes which occurred in connexion with his intimacy with Sir Walter Scott, and which have been duly forwarded to Mr. Ruskin, at whose request they were compiled. During his long career he has been remarkable for his accuracy in and application to business, and for his clear-headedness and judgment, and by his many clients he was always treated more as a personal friend than as a professional adviser. He was a member of many of the chief London societies, and also an honorary member of several of the provincial archæological societies. In conjunction with Mr. Albert Way, with whom he was especially intimate, he was one of the founders of the Royal Archæological Institute at the time of its separation from the parent body, and was for several years on the council of this society, and the Society of Antiquaries, of which he became a fellow in 1824.

Illustrations of the following of his works will be found in our previous volumes:—The New Front, Buckingham Palace, vol. for 1847, pp. 410, 411; the Residence of Prince Woronzow, in the Crimea, 1850, p. 354; the Hilton and de Wint Monument, Lincoln Cathedral, 1865, p. 227; Monument to General Foster Walker, Kensal Green, Cemetery, 1866, p. 306; Font in St. Thomas's Church, Dudley, Worcester, 1867, p. 630.

Mr. Blore married in the year 1819, Sarah, daughter of the Rev. W. Hodges, vicar of Matteraly, Nottingham, who predeceased him, and by whom he has a family of two sons, viz., the Rev. E. W. Blore, senior fellow of Trinity College, Cambridge, and the Rev. G. J. Blore, D.D., head master of the King's School, Canterbury; and two daughters, viz., Harriet, married to the late Dr. Cureton, Canon of Westminster, and Margaret, married to Mr. Charles Keyser, of Stanmore.

His remains were interred on Tuesday last at the City of London Cemetery, Highgate.

THE LATE MR. GEORGE SMITH, J.P.

We are unwilling to let the death of this well-known member of the building community pass without an expression of sincere regret. He was for a long time the head of the firm "George Smith & Co., of Pimlico," and executed many large and important public works both in and out of the metropolis. He left business some ten years ago, having realised a fortune, and retired to a charming estate in Worth, Sussex, known as Paddockhurst, where he died on the 27th of last month, in the seventy-third year of his age. Although he had been ailing for some time, he had recently purchased additional land, and was at East Grinstead on the market-day in the previous week. The immediate cause of his death was paralysis. Mr. Smith was very good to the neighbourhood and will be missed; not least so on the Bench, where his strong common sense and wide experience made him a valuable attendant.

Lower Heyford.—On the 4th inst. the chancel of the ancient and interesting church of St. Peter and St. Paul, Nether Heyford, was re-opened. The nave and tower were restored in 1854 by Mr. Butterfield, of London. The architects who have been entrusted with the restoration of the chancel are Messrs. E. F. Law & Son, of Northampton; Mr. John Smith, of Heyford, being the builder. On the south side of the east end a new window, of Decorated character,—an exact copy of the ancient window, which was very much dilapidated,—has been inserted. The old flat lead roof has been replaced by an entirely new and substantial roof. The principal timbers are stained and varnished. A new organ-chamber has been built at the south side of the chancel, with arches opening one into the chancel and the other into the south aisle. All the internal arches are of Harlestone stone, and the new windows have been executed in the same material. Some blocks of stone at the termination of the labels in the church, which were left in the rough at the last restoration, have been carved by Mr. Phillips, of Northampton.

THE DEATH OF BARON TAYLOR, AND OF "CHAM."

THE ranks of the artistic army of France have been sadly damaged by the loss last week of two active veterans, the Baron Taylor, and "Cham," of the *Charivari*.

In the death of Baron Taylor, which took place on Saturday morning, the 6th inst., at twelve o'clock, after a lingering illness of a year, the world of art and letters has lost a firm friend, a man of warm heart, and deservedly universal popularity. Born at Brussels on the 15th of August, 1789, Baron Taylor was, at his death, in his ninety-first year. Of English origin on his father's side, his mother was a Flemish lady, and from each of his parents he seems to have inherited much of their respective national characteristics,—English practical and philanthropic good sense, and foreign artistic appreciation. A Frenchman by the naturalisation of his parents, young Taylor entered the art-world of Paris, and after a term in the *atelier* of Suvé, he commenced his career with the brush and the pencil; but his power of equally well handling the pen enabled him to contribute a number of remarkable articles to the Parisian press. Exempted from military service on account of feeble health, he was able to satisfy his desire for travel, and the marvels and museums of Italy, Spain, Holland, and Germany were successively visited and eventually described. With the Restoration he entered the army, and gained some distinction in Spain, but on his return, resigning his military position, he was entrusted with several important archæological expeditions in France, in Europe, and in the East, the results of which he has left in more than one magnificent illustrated work, which for their accuracy and splendour have long been prized by students.

One of his chief claims, however, to the gratitude of the artistic world lies in the fact that he was the first to solicit and obtain the restoration of the principal monuments of the French architecture of the Middle Ages, and it is to his energy that we owe the preservation at a time of universal neglect, of the many châteaux, churches, and abbeys that might have fallen a prey to the ruthless carelessness of parish authorities. By his constant petitions to the Chambers, by his active intervention, by his artistic agitation in society and in the press, he succeeded in saving the historic monuments of France, and now these buildings, classed among the "*monuments historiques*," are protected from mutilation, and made the object of watchful care and intelligent restoration.

In 1824, he was nominated to the post of "commissaire royal" for the Théâtre Français, and he held this post at the stirring period of the birth of the new romantic school, when Victor Hugo, Alexandre Dumas, and Alfred de Vigny inaugurated a new literature, the direct result of the influence of Sir Walter Scott and Lord Byron. In this position he further radically transformed many of the old traditions of the stage, and introduced more than one innovation still in vogue.

Such acts alone would suffice to deserve the gratitude of posterity, but to these he added the purchase of the famous Obelisk of Louqsor, which forms so conspicuous a feature of the Place de la Concorde, together with many other of the Egyptian treasures of the national museum. His diplomatic powers were shown in the tact with which he was able, with a Government grant of 100,000 francs (4,000*l.*), to obtain the obelisk at the cost of 17,000 francs (680*l.*).

But Baron Taylor has done more than this, and in addition to the many valuable acquisitions he has made in his voyages to the East, and with which he has enriched the national collections, he has founded numerous benevolent societies, to aid not alone the painters, but all the various members of the great artistic professions, letters and the drama. He lived for the arts alone, and their protection and development, and a noble list is it of societies which he had founded, and all of which at present are in thriving condition; that for dramatic artists; the musical artists; the painters, sculptors, architects, engravers, and draughtsmen; inventors and workmen; teachers; the society of the men of letters; and the society of the authors and dramatic composers. Baron Taylor, in dying, leaves a numerous family; his funeral was officially honoured, and what is more grateful, his death will be sincerely regretted and deplored. He died a member of the Academy of Fine Arts, and a Commander of the Legion of Honour.

We first became acquainted with Baron Taylor at the Antwerp celebration of Rubens in 1861, and record his death with personal regret.

With the death of Cham,* the famous caricaturist of the *Charivari*, France has lost one of its old favourites. Cham, unlike our own inimitable Tenniel, has gained his reputation alone for his caricatures; in Cham's designs there was never any attempt at severe artistic or academic display, and his method of teaching by the pencil has been more by the aid of good humour and fun than by satire and fable. Cham's place as a caricaturist may be easily filled in France, but his memory will long be cherished by a large circle of sympathising and loving friends.

GYPSUM IN SUSSEX.

THE members of the British Association have sometimes been described to the effect that they are intellectual hybrids between a visionary *dilettante* and a theorist who never brings his imaginary views to a practical issue. Whether this criticism be fair in a general way it is not a part of our duty to inquire, but we may say that the views promulgated under the auspices of the members of the British Association sometimes lead to practical results, which prove to be more or less valuable, by inducing engineers and other scientific men of business to follow up suggestions made by or before them. The instance we now have to relate may fairly be set down to the transactions of the British Association.

It will be remembered that in 1872, when this body held its annual meeting at Brighton, a considerable sum of money was collected for the purpose of paying the cost of boring in the south of Sussex, with a view to ascertaining whether the Belgium coal-bed extended to the South of England, and lay within working distance from the surface. This boring was commenced at Netherfield, near Battle, under the superintendence of Professor H. C. Ramsay and other scientific celebrities and some gentlemen of the district. The experiment failed, however, as regards coal, for, after two trials and a depth of some 1,900 feet had been reached, it was found that the boring-tools were too small to go deeper, and as no signs of coal had been discovered the project was abandoned.

But although the presence of coal in Sussex was thus left an open question, another valuable mineral, viz., gypsum, or sulphate of lime, was found to exist in several beds or seams, some of which lay at an easily workable depth from the surface, the first seam having been struck at the depth of 160 ft. under the spot where the boring suggested by the British Association was carried out.

The reports of this discovery attracted the attention of Messrs. Bosworth & Ison, of Ashby-de-la-Zouch, who were familiar with mining for gypsum in that district and Derbyshire, and they proceeded to Battle, and ultimately came to an arrangement with a neighbouring landowner, Mr. C. A. Egerton, for sinking a shaft. As the result of this was beyond their sanguine expectations, they came to a further arrangement for mining under a given area of the above proprietor's land, and for erecting the works required for making the gypsum marketable. As this was anything but a small undertaking, some capitalists were invited to join Messrs. Bosworth & Ison, and a private company was soon formed, their style and title being "The Sub-Wealden Gypsum Company." As substantial evidence of their confidence and earnestness, most complete and efficient works have recently been completed, at a cost of 40,000*l.*

A brief description of these works, which represent the above large and spirited outlay, will no doubt be of interest to our readers. To begin at the beginning. About midway between Battle and Robertsbridge there is a siding formed by the South-Eastern Railway Company, at a cost to the Sub-Wealden Gypsum Company of 1,200*l.* From this siding the latter company's private railway runs at a gentle incline for a mile and a quarter through a valley of beautiful oaks and underwood. As we passed round the third or fourth curve in a truck propelled by the Sub-Wealden Gypsum Company's own locomotive, we came upon the singular picture for such a rural spot of a towering chimney or "stack," and six tapering ovens, in which the raw material is dried. These ovens we will, however, refer to later on.

The mine, of course, is the starting-point in these works. The upper seam of gypsum only is being worked at present. To this seam, which is 125 ft. below the surface, we descended in a "cage." Having landed in one of the galleries, we, with lighted candle in hand, followed our guide. The miners were working in four directions, the caverns they leave behind them being about 6 ft. or 7 ft. square. In the course of our exploration we came across four sets of three men who were doing the required work for breaking up the seam. The process by which this is done is the Cornish system of blasting. In fact, the miners are mostly Cornishmen. A well-sharpened steel bar is held in an oblique position by one man and two others strike it in ding-dong fashion with sledge-hammers. The hammer-men are well practised at their work, as they need be for the sake of the hand of the man who holds the steel bar, over whose shoulder they strike. One feature of this boring is that the bore-hole must be made at the top or bottom of the seam of gypsum, or the explosion will not have the desired effect. The bore-hole being completed, it is dried out, the required quantity of powder is poured in, a plug is rammed down, a fuzee applied, the men retire to a corner and in a short time a body of the seam of gypsum *is* reduced to pieces that can be easily dealt with. Here, however, some further work has to be done, for the gypsum is surrounded, and occasionally mixed, with thick layers of limestone which come down with the explosion. This limestone is not of sufficient value to be taken to the surface, but it is advantageously used below by being packed in tiers so as to take the bearing of the roof, whereby at some future time the blocks of gypsum which remain between the present galleries may be utilised. The roof, we may add, is fortunately very level and sound, so that there is no difficulty whatever in this respect in proceeding with the mining for gypsum.

This Sussex gypsum is partly white, or of so pure an alabaster quality that it may be turned into cups or ornaments, and polished, or it is ingrained and stained with grey substance. This grey substance is limestone, and in this fact lies the superiority of this Sussex gypsum. In the Derbyshire and most of the European deposits the ingraining and staining is a red clay, the chemical quality of which is oxide of iron. This oxide results in efflorescence, as the plaster made from gypsum containing it loses its water, and if paint or gilt be applied this is loosened and falls away. This trifling mixture of limestone in the Sussex gypsum has, however, no effect of this kind, while its grey appearance, as an intermixture with the gypsum in its raw state, is completely lost during the process of baking, the result being there is no stained appearance, but it dries to a "cool" white, while it may be painted or gilded as soon as it has set. The specimens we saw at the works, and some of which we now have before us, fully bear out this view.

The works for reducing, baking, and grinding the gypsum are of great engineering and mechanical interest, but we may dismiss them in a few sentences. Three steam-engines are employed; one of 200-horse-power, for driving the heavy 5-feet diameter French burr mill-stones, and the stone-breakers and crushes; one of 60-horse power for raising the wagons of gypsum from the mine; and one of 10-horse power, for doing such lighter work as pumping.

The first mechanical operation to which the gypsum is subjected after it arrives above ground is for it to be passed through one of Blake's powerful stone-breakers, two of which are in use. But before this is done the lumps or blocks are overhauled by skilled men, and any corners of limestone that may adhere to them are knocked off with hammers suitable for the purpose. The gypsum blocks are then crushed in the stone-breakers, and fall into wagons, whence they are subsequently elevated by a lift to the floor on a level with the oven doors. As we are dealing with results rather than with the details of processes, all we need say here is that the ovens are 9 ft. in diameter, that they hold 25 tons each, that coke is used to produce the required heat, and that the gypsum is sufficiently calcined in twenty-four hours.

On the gypsum being withdrawn from the ovens it has lost its original lustre. It is left on the floor to cool, and after being again assorted, or picked over, should any grey nubs

* The pseudonym of the Comte de Noë. See *Builder*, Feb. 17, 1877.

have parted from the gypsum during the baking, it is then passed between serrated crushers to reduce it to nuts, as we may term this process, when it is passed through the heavy millstones above mentioned, from which it comes in the form of the impalpable powder which is known as the gypsum, or plaster of Paris, of commerce. As the powder falls from the millstones it is weighed in bags, which hold 2 cwt. each. In this form it is ready for distribution to any part of the United Kingdom or the world.

A few concluding remarks will now be sufficient to fully show the importance of this discovery of gypsum in Sussex. The promoters of the Sub-Wealden Gypsum Company relied much,—after they had made the required experiment,—on the exceptional purity of the gypsum they were about to place on the market. They have been nearly four years in bringing their works to their present state of completeness and efficiency. Some months of this time was lost because they made the engineering mistake of fixing engines and machinery of the power and capacity of those employed in raising and reducing the Derbyshire gypsum. But even this error has turned out to be an advantage, for the extra hardness of this Sussex gypsum in its raw state turned out to be an indication that it would become of extraordinary hardness when it had been reduced and had again set in builders' or moulders' hands as plaster cornices, or other house ornaments. Another advantage which the Sub-Wealden Gypsum Company rely on is that they will be able to supply builders in London and the South of England with their superior article at a lower price than gypsum has hitherto been sold for. The company are now preparing 250 tons per week for the market, and they will be able to exceed this quantity greatly with their present arrangements so soon as they have adapted their present division of labour more fully to their increased steam power and capacity of their machinery, while they are sinking another shaft to facilitate the raising of the raw material from their mine.

There are agricultural advantages for the South of England connected with this mining for gypsum in Sussex. Every one who has the slightest knowledge of agricultural chemistry knows the value of sulphate of lime on soils where free acids exist, and also of its capacity for fixing ammonia, in stables, cow-sheds, and pigsties, whereby it is rendered harmless, and at the same time retained till it is placed in contact with growing plants. This subject will, however, no doubt be fully dealt with by our agricultural contemporaries. But there is one important sanitary use to which this gypsum may be put that certainly comes clearly within our province. When we have had occasion to inspect the construction of outside closets for suburban houses, village cottages, and farm-houses, we have often found a simple pit made. What accumulates in these primitive places soon begins to ferment, and become not only offensive, but exceedingly dangerous to health. The injurious gases from such places may be fixed by this combination of sulphate of lime, and therefore rendered innocuous to animal life, while they are rendered easily and pleasantly portable for fertilising cultivated vegetation. Builders may take this as a hint for them to persuade owners of houses with outside closets in country places to have suitable tanks for the reception of excreta and the application of gypsum, as the deposit will then be turned to greatly increased manurial value, and its danger to health obviated. The quality offered for this deodorising purpose is not of the same purity as regards whiteness as that which is produced for moulding and plastering, but it is equally efficient from a sanitary and manurial point of view, and we are informed it is offered at a very low price.

Somersetshire.—The Marquis of Bath presided on Monday afternoon over an important meeting at Bridgwater in connexion with the Somersetshire Draining Act, obtained for the more effectual drainage of lands within the county and the prevention of the annually recurring floods that of late years have proved very destructive. It is intended that more than 90,000 acres shall be brought under the jurisdiction of the newly-formed body of Commissioners, the whole of this acreage being below the height of the highest recorded tide, namely, 24 ft. Also that important works of arterial drainage shall be undertaken, including, it is understood, the widening and deepening of the river Parret, and a new cut through the Sedgmoor districts.

THE PRIVATE BILL LEGISLATION OF THE LATE SESSION.

THE Session of Parliament recently concluded has resulted in the passing of 198 private Bills, of which 60 are railway Acts, 17 tramway Acts, 22 gas, 17 water, 13 docks and harbours, and 23 town improvement Acts, the remaining portion being made up of Acts of a general and miscellaneous character. Of the railway Bills which have received Parliamentary sanction, 54 were promoted by existing companies, and as the entire number of Bills of this character was 74 only, it will be seen that more than two-thirds of the number have been successful. The proposed capital for the works connected with these 74 Bills amounted to 11,513,870*l.*, and the additional length of railway to be constructed under them was 248 miles. By the powers which have been obtained in respect of the 54 successful Bills, an aggregate expenditure of 9,938,000*l.* has been sanctioned for the construction of 174 miles of additional railway and other works by the several companies named. The largest amount of expenditure for extension works under their several new powers is 2,003,000*l.* by the London and North Western Company; 1,200,000*l.* by the Midland Company; 660,000*l.* by the Manchester, Sheffield, and Lincolnshire Company; 573,333*l.* by the London and Brighton Company; 444,000*l.* by the North British Company; and 400,000*l.* by the London, Chatham, and Dover Company. The remaining six railway Bills which have successfully passed through Parliament are for the incorporation of companies for the construction of entirely new lines of railway, 63 miles in length, the capital for which is 772,000*l.* These figures show that not more than one-fourth of the Bills promoted during the session by new companies were successful, the entire number of Bills of this class being 24, for the construction of 206 miles of new railways, at an estimated outlay of 7,873,766*l.* The most important of the new companies is that for making lines to connect the Northampton and Banbury and the East and West Junction Railways, near Towcester, with the London and North Western, near Roade, and the Northampton and Bedford line of the Midland Railway at Ravenstone, near Olney.

The works to be constructed under the seventeen Tramway Acts comprise upwards of eighty miles of tramway in the metropolis and several provincial towns, the capital for which is upwards of 1,000,000*l.* The longest of these proposed tramways are those to be made by the Glasgow Corporation, and which are fourteen miles in length; those in St. Helen's, ten miles; Ramsgate and Margate, six miles; Manchester Suburban, nine miles; the new London Street Tramways, eight miles; and the South London Tramways, in the parishes of Battersea, Clapham, and Lambeth, seven miles in length. The estimated cost of the two last-named metropolitan lines is respectively 125,000*l.* and 138,000*l.*

The proposed expenditure on the several new works in connexion with gas and water Acts is very large. The aggregate proposed capital for the new gas works under the various Acts amounts to 1,500,000*l.*, of which the Newcastle-upon-Tyne and Gateshead Company propose to expend 375,000*l.*; the Brighton and Hove Company, 312,000*l.*; the Preston Company, 200,000*l.*; the South Shields Company, 100,000*l.*; and the Mirfield Company, 82,000*l.* For the works to be executed under the various new water Acts, the capital required amounts to no less than 5,039,250*l.*, of which the estimated cost of the Manchester (Thirlmere) works is 3,425,000*l.*; Nottingham, 800,000*l.*; Birmingham, 300,000*l.*; and Belfast, 170,000*l.* It should be added that the above particulars, so far as they relate to tramways and gas and water supply are exclusive of provisional orders made by the Board of Trade, under which a large number of undertakings of this character are intended to be carried out, involving a still further heavy expenditure. But apart from the expenditure to be incurred under provisional orders, the aggregate expenditure sanctioned in works by railway, tramway, gas, and water companies, under the several Acts of Parliament which have been obtained amounts, in round numbers to 18,249,250*l.*

The various Acts which have been obtained for town improvements will likewise be attended with a very considerable outlay in the construction of new streets and general sanitary work in the localities affected. These Acts apply to several of the principal towns in the provinces, including Bath, Blackburn, Blackpool, Cardiff, Derby, Dublin, Leeds, Leicester, Norwich, Nottingham, Over-Darwen, Rochester, Rotherham, St. Alban's, Stratford-upon-Avon, and Warrington.

Under the docks and harbours Acts of the session works of this nature have been sanctioned at Aberdeen, Dublin, the Medway, Sharpness, Whitby, Whitehaven, and at the Millwall and East and West India Docks.

The several Acts which have been passed in which the metropolis is interested include measures relating to the City of London School, the Crystal Palace District Gas Company, the East and West India Dock Company, East London Railway, Leadenhall Market Improvements, London Bridge Approaches (the last-named Act was changed from its original title "London Bridge," and limited to "London Bridge Approaches"), London Street Tramways, Metropolitan and Metropolitan District Railways, North and South Woolwich Subway, South London Tramways, Southwark and Deptford Tramways, Thames River (Prevention of Floods), and Millwall Docks.

There is plenty of work here cut out.

HUDDERSFIELD.

HUDDERSFIELD proved the truth of the expression of Horace, that wealth "new-born trouble brings" to those who exchange for it their "Sabine vale." It found wealth, but its wealth was accompanied with trouble, through its land ownership,—trouble which, however, has passed away now. Huddersfield is an ancient town, as the attribution of its name to an "original Saxon settler," named Oder or Hudder, of itself proves; its rivers and canals, its position and surroundings, have brought it trade, and given it growth, as we shall find. Without preface, let us look at the town in the past and the present. Forty years ago Huddersfield was a town of importance, but not as it is now. It depended chiefly on the woollen trade; it had its parish church and half a dozen Dissenting places of worship. Its mechanics' institute was youthful and vigorous; it had several philanthropic societies in advance of the age; and from a barren country round about it drew coals in abundance. Its population was, for the whole parish, 31,041 in 1831,—an increase within the previous decade of 7,000; and under the provisions of the Reform Bill, its one member was returned to Parliament by the voters out of the small total of about 600. The town was lighted by gas,—a circumstance not so general then; and fair attention was bestowed on its sanitary surroundings. There were three banks in Huddersfield then,—the Huddersfield Banking Company, the Mirfield and Huddersfield Bank, and that of Rawson & Co. Of cloth-dressers there were many, from Lindley to Fartown; there were half a dozen fulling-millers, many woollen cloth and fancy goods manufacturers, a paper-maker at the Forth House mill; twelve scribbling-mills; three of the Greenwoods were shuttle-makers; whilst velveteen-makers, woolstaplers, and others of kindred trades from the outskirts centred in the town. It had no railway then, but the "Royal Mail," the "Tally-ho," and other coaches did service, whilst many carriers, Pickford's "Fly-boats," and the water conveyances of the Kenworthys, Marsdens, and Carvers, did duty in their respective spheres. Since these days Huddersfield has been greatly changed, and for the better; whilst it has grown it has added to itself the attributes of growing towns, and it has, moreover, widened the area of its borough, and enlarged the liberties of its inhabitants. It depends still in great degree on woollens and worsted, and retains a hold on silk and cotton industries, while machinery and mining help it in large degree; and here it may be at once said that its population has risen to 121,892 at the last census, and that there is probably a continuance of the increase, which has marked itself so fully in previous decades,—an increase to be tabulated in a year or two.

Plunging into a mass of statistics, let us say that Huddersfield has an area of 10,998 acres, its population dwelling in 15,598 houses in the municipal borough, and that there are now over 13,000 electors to its one member. The amount of property and profits assessed to the income-tax was, in 1876, about 1,170,000*l.* As to the earnings in its great woollen industry, it may be said that an official report shows that they vary greatly,—in pre-

paring woollen cloth, from girls at 8s. per week, to foremen scribblers at 60s., and in weaving there is as wide a discrepancy. That industry has shared in the depression which most trades have known in this country in recent years, and from which they are only now apparently beginning to show signs of revival, but in the Huddersfield district the textile trades have taken deep root, the roots being also wide spread, and their present greatness is one of the best signs of the probable future growth of the town. But it does not depend exclusively on woollens or cotton, or silk. Its production of coal is large, thirty-six mines being included in the Huddersfield sub-district in the latest report of the mine inspector for Yorkshire, whilst several of these produce also considerable quantities of fire-clay in addition. But the value of these fuel-supplies is less in the way of those vaster supplies found in great mining districts than it is to ensure a cheap supply for the mills and manufactories around Huddersfield. For it is not only in the town, but in the many growing manufacturing villages near, that the trade of the Huddersfield district finds scope, though it is to that centre that it looks for its proper market. Here also the traffic of the district converges, as does also travel, by railway, 'bus, and occasionally by other methods. With that growth of trade there has been a growth of some of the evils which usually accompany great populations, for in a recent Blue Book it was stated that in Huddersfield one person out of every 118 of the population was yearly arrested for drunkenness, and it was also stated that there was one public house to every 247 of the population, so that the "droughty clay" of the town seems to have full facility for gratifying its thirst. The borough has had to provide for a large pauper community, and it has its full share of disease and accident, for which provision has been needed. There have been during the forty years attempts to meet the growing religious and scholastic needs of the community, as well as those of government in local affairs, and some of the buildings that are the result are architectural additions to the beauties of the town, whilst hitherto its comparatively young corporation has done good work in its own department.

As to the future of Huddersfield, it cannot be said that it gives the signs of a growth so rapid as it has experienced in the past. It belongs to the towns which depend upon manufactures; and it is evident that though Great Britain may retain its manufacturing supremacy, yet it will not continue to be the manufactory for the world. That is to say, some of the Continental nations are beginning to manufacture, and though they do a fully compete with us yet, they must to a very large extent manufacture for themselves, and England will need to find other markets for part of her manufactures. But though we may not be the manufactory of the world, we shall continue apparently for some time to be its mart. Hence the progress now should be most rapid in those towns which depend upon the sale and transit of goods to all parts of the world, rather than in those which manufacture. Huddersfield is one of the latter, but it has in it the elements of growth, though not perhaps to such a great extent as in the past. It has planted great trades in its midst and around it; these trades will in some measure grow, and if old markets are withdrawn from England there are new markets to be found for the looking,—markets into which it must be many years before we have to compete with native goods. Having built up a population on these industries, it is not to be expected that this great centre of the woollen trade shall rest there. But it is evident that it will have increased competition to meet with, and its motto will have to be to improve its product and to cheapen the cost of production. Waste will have to be lessened very greatly; the fullest measure of power will need to be extracted from coal; rates will need to be brought down, and economies all round, whilst every effort will be needed to lighten the capital charges by spreading them over an increased area of production. With an improvement of the product, and with less dislike to new processes with better work and cheaper goods, the Huddersfield of the future, preserving and extending its good government and its full attempts to educate, in the entire sense of the word, may compare favourably again with that of the present, as the latter does with that of the past.

EDUCATION AT THE ANTIPODES.

As ardent promoters of the cause of education in all parts of the world, we cannot refrain from translating and reproducing the following extremely typical proclamation. This royal manifesto testifies to an enlightened disposition of the sovereign lady governing a semi-barbarous state, which might serve as a good example to rulers of other and more advanced countries. This is the document, which we give as literally as possible:—

"I, Queen Ranavalona, by the grace of God and the will of the people, Queen of Madagascar, protectress of the laws of my kingdom, &c.

I say as follows. Inhabitants of Iboina, I am happy that the Gospel of Jesus Christ should be spread in my kingdom, to render my people wise and good by the knowledge of the true God. But it is not only the Imerinas who have heard this Gospel, it has also reached you, people of Iboina, and for this I am especially grateful to God.

And now I will make you know the number of pupils that may be fonnd in each of your towns. I have had these statistics printed, so that you may all see them, and so that you may be convinced that I see and hear all; for, in truth, I see and hear all, because my subjects are as so many eyes and so many ears looking and listening for me. And when I examined the number of your children who go to school I remarked that there were very few as compared to the population of Iboina.

Consequently, send your children to be instructed, for it will be a benefit to you as well as to them. It will be the means of keeping an account of your cattle, of your money, of your property, and it will also be the road to advancement; for I am a sovereign who rewards amply those who deserve it.

And you, fathers and mothers, be also active; for I am happy in seeing my subjects good and wise. It is a thing that will benefit you, that which I advise you to do; for if it was capable of doing you any harm I should not order it. But I know that it will be for you a cause of prosperity, and on that ground I insist that you shall all instruct yourselves; therefore be all of you diligent, for though you may not now understand the beauties and joys of science and wisdom, you will appreciate these benefits when you possess them.

Thus has spoken,

Ranavalona, Queen of Madagascar."

SCIENTIFIC MISSIONS.

A PREMIUM FOR WRITERS ON ART.

The French Minister of Public Instruction has determined to give an impulse to the spirit of original research by appointing various missions. These embrace a variety of subjects which are not perhaps all of the most useful and practical description, but they will not fail to interest scholars and specialists. For instance, M. E. Thomas, Professor at the University, is entrusted with a gratuitous mission to study in the libraries of Berne, Leyden, Cassel, Dresden, Leipzig, and Munich, the manuscripts of Servius and Virgil. As a contrast to this form of research, the sub-director of the Lyons Museum, M. Ernest Chantre, will proceed to Kasan, to the Caucasus, the Crimea, and Turkey so as to prosecute anthropological studies. M. Emile Rivière, who is a member of the Anthropological Society, will continue, under the patronage of the State, his archæological prehistoric researches in the department of the Alpes-Maritimes, and notably in the cantons of Saint Cézaire and Saint Vallier-de-Thieys. M. Félix Pecaut, a journalist and a contributor to the *Temps*, will be despatched on a special mission to Italy for the purpose of reporting on the organisation of primary and superior education in that country. An eminent engineer, M. Paul Sardu, will proceed to Japan to report on the geology of that country, and investigate its mineral industries and resources. Finally, M. Charles Sauvestre, the well-known writer, will collect, analyse, and classify all documents and reports concerning the history and organisation of primary instruction in France.

If these were the only missions and forms of research supported by the Government, we should find much to criticise, and might object that there are many other matters of far greater moment which require immediate attention. The appointments we have mentioned are, however, but a small instalment of the measures the Government of the Republic will adopt so as to forward the cause of learning in its every branch. With regard to the more practical form of study, such as engineering and architecture, we know that the French people are richly endowed, and that native talent readily obtains State aid to facilitate its development. In this respect, the most recent form of encouragement, which it may not be out of place to mention, is the notice just issued by the Académie des Inscriptions et Belles Lettres, announcing that the Louis Fould prize will be given for the first time during the course of the year 1881 for the best history of art and design up to the epoch of Pericles. For this purpose M. Fould has placed 20,000 francs at the disposal of the Academy. Foreigners as well as Frenchmen are allowed to compete, and their works must relate to all that concerns sculpture, painting, engraving, architecture, and arts generally as applied to industry.

THE MUSEUM OF PICARDY.

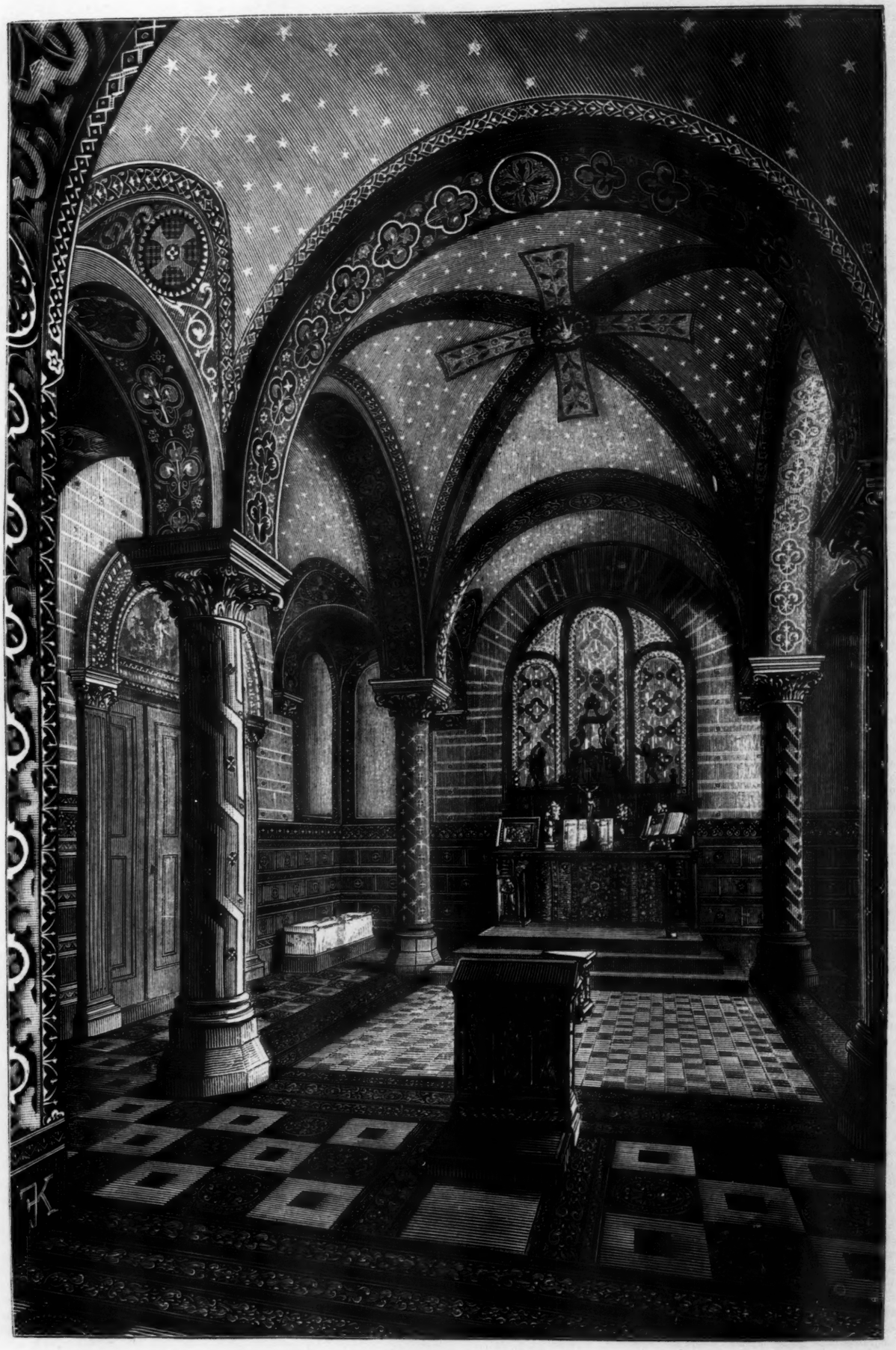
Archæological researches in France have been so extended within the last quarter of a century, and so many precious vestiges of the past brought to light, that it was deemed expedient to establish depôts for the reception of these valuable relics of a bygone age, and in these products no part of France has proved more fertile than the North. In consequence, the Picardy Society of Antiquaries resolved upon the construction of a museum, and in 1852, from the proceeds of several lotteries, and under the auspices of Napoleon III., the ground where formerly the old arsenal stood was granted to them, in addition to another piece of town land, known as the Moreaucourt. The museum was constructed upon the plans of M. Parent, and completed by M. Diet in 1865. The success of the work is due, above all, to the energy of Mr. Charles Dufour, member of the Antiquarian Society, and who was also president of the commission appointed by the Government. One of the galleries bears his name. In 1870 the Society offered the museum to the town of Amiens, who entered into possession on January 15th, 1873.

The form of the museum is a rectangle, and is composed of a ground-floor and one story. The former is devoted to the antiquities, medals, and sculpture, ancient and modern. The first-floor contains paintings and engravings, the greater number and most important of which have been given by the Government. Behind the museum, and belonging to it, is attached an archæological garden.

The paintings in the chapel were executed from the designs of M. Diet, the architect. The two over the door, "God, thy Father," and the "Creation," are the work of M. Charles Borély. There are also some very fine stained-glass windows of the sixteenth century, and antiquities of a most interesting nature, mostly local.

We have to thank M. Charles Borély, the indefatigable director of the museum, for useful information, and we would suggest to tourists the advisability of visiting the Museum. They will not regret the time spent there, and some, perhaps, may find it equally interesting as the famous cathedral.

An Artist's Will.—The will (dated June 28, 1879) of Mr. Charles Landseer, R.A., late of 35, Grove-end-road, St. John's-wood, who died on July 22nd last, was proved on the 16th ult. by Thomas Hyde Hills, John Percy, M.D., and Arnold William White, the executors, the personal estate being sworn under 30,000*l*. The testator bequeaths Stubbs's studies of the anatomy of the horse to the Royal Academy of Arts; 500*l*. each to the Royal National Lifeboat Institution and the Middlesex Hospital; 1,000*l*. each to the Artists' General Benevolent Institution, the Artists' Orphan Home Fund, and to the Benevolent Fund of the Artists' Fund; 10,000*l*. to three trustees to be named by the President and Council of the Royal Academy of Arts, London, upon trust, to apply the income towards founding one or more scholarships, to be called "Landseer Scholarships," such scholarships to be tenable for such periods, of such amount, and awarded on such conditions, as the said President and Council shall, by rules to be made by them, from time to time prescribe; and other legacies. The residue of his property he leaves to his brothers and sisters.



THE MUSEUM OF PICARDY: INTERIOR OF THE CHAPEL.

IMPERATOR NAPOLEO III
LIBERALVM. ARTIVM. PROTECTOR
SAMAROB. AMBIAN. HOSPES AVGVSTVS
LOCO PVB. DATO. HOC. MONVMENTVM
SOC. ANTIQ. PICARDAE RE COLLECTO
EXTRVENDVM INSTITVIT LEGE LATA
DIE XX MENSIS APRIL ANNO MDCCCLIV
MUSEE DE PICARDIE

THE MUSEUM OF PICARDY, AMIENS, FRANCE.—M. PARENT AND M. DIET, ARCHITECTS.

PROPOSED RESTORATION OF STEETLEY CHAPEL, DERBYSHIRE.

A LECTURE, on "Steetley and the Neighbourhood," was given on the 3rd inst., at the Corn Exchange, Worksop, by Mr. J. C. Cox, author of "The Churches in Derbyshire." Mr. F. J. S. Foljambe, M.P., presided. The lecture had more particular reference to Steetley Chapel, in the parish of Whitwell, and was given in aid of the work of restoration. The chapel, which is an interesting example, is attributed to the reign of King Stephen. So late as the beginning of the eighteenth century it was covered with a vaulted roof, but this has long since disappeared. It is now proposed to restore the building, and to arrest the progress of decay, not merely from motives of antiquarian interest, says the *Independent*, for at Darfould a new shaft has been sunk for coal, a new population is springing up, twenty-five houses have been built and inhabited, and Steetley Chapel alone promises to supply a place of worship.

Mr. Cox commenced by saying that the reason why they knew so little about the chapel probably was, that about the year 1400 it ceased to be a parochial church of its own, and became involved in the neighbouring church of Whitwell. The probability was that Steetley Chapel was designed and carried out at the expense of Gley de Breton, between the years 1120 and 1140, and, after being many years in the hands of the Vavasours, was sold in 1360 to the celebrated baronial family of Freshfield, of Staveley, who held the Steetley estate on condition of a nominal service to the Vavasours. It was fair to conclude that about the year 1400 the church became attached to Whitwell, although in searching the diocesan registers and other documents, he had failed to find any account of the amalgamation of Steetley to Whitwell. This was the more curious, because he had had no difficulty in tracing such amalgamation in other cases; for instance, he found that the church at Duckmanton (a few miles from Chesterfield) was united to Sutton, because it burdened the people to sustain the two fabrics. The property at Steetley remained with the Freshfields until the end of the reign of Elizabeth, when it was sold to Sir Thomas Wentworth, and ultimately passed to the Duke of Norfolk, but it was purchased by the Duke of Newcastle in 1842. It was interesting to notice that one of the rectors of Steetley, Lawrance, the leech, was instituted in 1349, probably because he could cure bodies as well as souls. At that time a great plague devastated Europe (in 1348-9), and was brought to England by some fishermen who landed in Dorsetshire in 1348. In May, 1349, the plague reached Derbyshire, and permeated throughout the kingdom. The deaths in Europe were estimated at 25,000,000, and one burial-ground in London, the site of the Charterhouse, received 50,000 bodies. In Derbyshire alone 77 beneficed priests died from the plague, and 22 others resigned. Nor were the monastic clergy more fortunate. The plague had a most important bearing upon agriculture, upon political life, and architectural history, especially as it gave a great spur to church building and religion. The details of Steetley Chapel were surpassingly interesting. The building was of simple construction. Its nave formed a parallelogram, the chancel was something like a square, and to the east was the sanctuary, in the shape of an apse, seldom seen now in England, although often met with in Germany, and certain districts in France. The exterior length of the whole building, taking the outer walls, was 62 ft. 6 in.; the length of the sanctuary, 11 ft. 3 in. by 12 ft. 7 in.; the chancel, 16 ft. by 14 ft. 6 in.; and the nave, 29 ft. by 16 ft. The width of the chancel arch was 8 ft., and the sanctuary arch a little over 10 ft., and the walls, which were substantial throughout, varied from 2 ft. 9 in. to 3 ft. in thickness. One of the great beauties of the building was the very perfect condition in which it had been left since Norman times. The greater portion of our Norman work had been built over, and interfered with by subsequent styles, but so far as his opinion was worth anything he unhesitatingly pronounced Steetley Chapel as the most perfect specimen of Norman architecture to be found anywhere in Europe. The lecturer described the sculpture upon the main entrance, and the band of elegantly-carved interlacing foliage which ran outside the apse, and after referring to the twin objects of the chapel,—a place of worship in times of peace, and a place of refuge and defence when the barons were engaged in fighting,—said his opinion was that the chapel was erected either at the end of the reign of Henry I. or at the beginning of Stephen's reign, somewhere about 1120 or 1140. Concluding, he spoke of the importance of preserving such a valuable specimen of Norman architecture, and wished the project for the restoration of the chapel the most complete success.

CUMBERLAND AND WESTMORELAND ARCHÆOLOGICAL SOCIETY.

THE members of this Society had a two days' excursion to the vicinity of Naworth and Gilsland on the 27th and 28th ult. At Naworth Castle the visitors were received by Mr. George Howard, M.P., who at once conducted them into the hall, where seats had been arranged at the upper end. Mr. Howard was elected to the chair. Mr. R. S. Ferguson contributed a long and interesting paper on the Barony of Gilsland. In the course of it he remarked that Lord Thomas Dacre built Askerton Castle, as his initials show, to guard against inroads from Liddesdale by Bewcastle and the Maiden Way; he built Drumburgh Castle out of the materials from the Roman Wall to stop invasions across the Solway; and his arms, with the garter round, are still over the door of the farmhouse into which the castle has been converted. He built the outworks of Naworth Castle, as his arms and his initials and those of his wife prove. Much of the upper part of the castle is due to him. Lord Thomas Dacre died 24th of October, 1525, his wife having died nine years before. They are buried at Lanercost, under a finely-carved tomb, on the south side of the choir. His eldest son succeeded as William Lord Dacre of Gillesland and Greystoke, and also succeeded as Lord Warden of the Marches. He was governor of Carlisle in the reigns of Edward VI., Mary, and Elizabeth, though not continuously. It is probably his wife who is commemorated on the silver-gilt racing bell in possession of the Corporation of Carlisle:—

THE . SWEFTES . HORSE . THIS . BELL . TO . TAKE
FOR . MI . LADE . DAKER . SAKE.

Sir George Duckett, bart., contributed copies of a number of letters from Col. Charles Howard, of Naworth, to the Lord Protector Cromwell, in 1655, and his Secretary of State, Thurloe, 1655-58.

Mr. C. J. Ferguson began the reading of a paper in the hall, on Naworth Castle, and afterwards, under the direction of Mr. Howard, the party were conducted over the building, Mr. Ferguson explaining the architectural features of most interest. He pointed out the advantageous position of the castle for the purposes of offence and defence, as it rises from the summit of a natural escarpment of rock and cliff formed by the precipitous sides of a ravine down which flow the waters of two rivulets. Being thus naturally protected on three sides, it required only an artificial barrier to the south-east, facing that gentle declivity down which the visitors had just come. The question they were now trying to fathom was how this building grew upon this site, or what sort of building was first erected upon it. The earliest documentary evidence was the licence to Ranulph de Dacre, in 1335, to crenellate. In was to be presumed that some building existed before this. On making a careful examination of the south-west tower, the Carlisle Tower, he found that the lower part of it and of the western curtain-wall was not later than the thirteenth century, and that it had formed the original peel tower, from which this great castle grew. By the position this tower occupied, he thought it was the intention of the first builder to form a large enclosure or bailey, and that was done by stretching a similar wall across the south-east front to that existing on the west front, and occupying the position of the present south-east front, and before it was formed a deep moat crossed by a wooden drawbridge. The tower consists, on the ground floor, of the cellar, which possesses a narrow single-light window, with a staircase in the thickness of the wall, giving access to the house-place on the first-floor. It was evident that the boldly-ribbed vaulting was a later addition. He took it that Ranulph de Dacre when he obtained licence to crenellate, found this tower either not entirely completed, or in ruins, and that he completed it, battlemented it and the walls on the bailey, formed the gateway to the castle on its south-west front, and probably built sundry offices under the curtain walls. The next documentary evidence was in the heraldic dress of the great builder of the family, Thomas Lord Dacre. He took it that in his time the castle had fallen into disrepair. He repaired the existing buildings and made considerable additions to them. He rebuilt the upper part of the Carlisle Tower, and entirely built the south-east tower, known as Lord William Howard's Tower. This tower possessed great peculiarities. It had evidently been an afterthought, and had been constructed at a more recent period than the curtain walls in the court-yard, which at this point formed a very acute angle, and Lord William's Tower consisted only of the upper stories which rise above the battlemented walls of the court-yard, and is carried upon a deeply-ribbed series of arches spanning the triangular space between the walls and the court-yard,—a most daring and ingenious piece of construction. The Howard Tower is carried in mid-air by an arch, and for all the support they give it the rooms, staircases, and wall below it towards the court-yard might be cleared away. In the unfortunate fire which occurred in 1843 this actually occurred. In the early part of the sixteenth century the hall had arrived at its greatest perfection. He had no doubt Lord Thomas built himself a hall, built the gate-house, and the boat-house, and thus formed an outer court-yard. During litigation which took place in the time of Elisabeth, Naworth was said to have been unoccupied for thirty years. A report at that time said it was in "very great decay in all parts, and the out-houses and other houses and offices are utterlie decayed." To Lord William Howard they must attribute the domestic buildings that now exist, the repair of Lord Thomas Dacre's work, the construction of the gallery along the south-east front, and the decorating and beautifying of the whole structure.

The visitors afterwards took a walk round the castle, Mr. Charles Ferguson pointing out some of the portions of the building he had mentioned in his paper.

Mr. R. S. Ferguson submitted a paper giving a full description of all the heraldic devices in and about Naworth Castle.

Having left the castle, the visitors were conveyed to Gilsland, where they dined together at the Shaws Hotel, and the first day's proceedings were at an end. Mrs. Howard had, through Mr. R. S. Ferguson, invited the members of the society to luncheon at the castle, but the invitation was declined, owing to the stern rule of the society not to accept hospitality of the owners of any place they may visit. This led to groans on the part of some who had been out many hours.

On the second day, Mr. R. S. Ferguson gave brief descriptions of sepulchral slabs found at Melmerby and Beaumont. That at Melmerby was curious as having on it a very unusual combination of a chalice, a clasped book, and a pair of sharp shears. A good deal of discussion had taken place at a meeting of the Archæological Institute, on this combination of the shears, which are usually attributed to a woman, with the chalice and book, which are considered the emblem of a priest. The slab at Beaumont had on it a rudely-cut harp. A slab that was exhibited was perhaps the most important. It was found a hundred years ago at Bowness, and has been lost ever since. It is mentioned in Hutchinson's "History of Cumberland." Quite recently it was found again. Hutchinson's description of it raised a controversy between the English and German epigraphists, the former doubting and the latter supporting its genuineness. The following is given by the *Carlisle Journal* as the latest reading of the inscription on the stone:—

ONIANVS DL
LODATE VITE ' IVRA QVARTVS
SVPPLEATV ' OTIS FIDM Q
AVERIS ' SAORABO CARMEN
IOXV . IRITIM LITTERIS.

A number of new members having been elected, shortly after twelve o'clock the party took their departure by train from Gilsland and went to Brampton, where they were met by carriages. In these they at once drove to Brampton old church, where Canon Dixon, of Hayton, read a paper on the old Hayton registers. Mr. Whitehead next read a paper on the church. He stated that when the ancient church was pulled down in 1789 the chancel was

allowed to remain, because the churchyard continued to be used occasionally as a burial-ground. Consequently what now remains is simply the fabric of the old chancel, with a modern porch added. In 1861 the burial-ground was closed by order of the Privy Council, but a new piece of ground was obtained close by, and the interior of the chancel was arranged as it stands at present. When that was done the east window was removed and a plain square sash window inserted, and the late Joseph Parker had said that a "fresco" was discovered on the north wall. He hoped Mr. Charles Ferguson would remove a portion of the plaster and see whether that was so. Though the renovation took place twenty years ago, nobody seemed to know anything about the roof, or even whether the chancel had one. At present there is a ceiling. Mr. C. J. Ferguson said the chancel was apparently Late Norman. In the south wall is an arch over a tomb, probably that of some great benefactor of the church, but he did not believe that the stone now beneath the arch is the original one.

The party proceeded next to Castlesteads. Here a number of Roman rings were exhibited, which had been found mainly during the making of a flower-garden by the late Mr. Johnson. This garden, said Mr. Ferguson, occupied the site of an old Roman camp. Most of the rings were set with gems, and two in especial were curious. One represented a human figure on the legs of a fowl, and Mr. King said it was gnostic. The other rudely represented a cross with a head on it.

With the return of the party to Brampton a very successful meeting was brought to a close.

A winter meeting is to be held at Penrith, probably in the second week of December.

"ELECTRICITY AS A MOTIVE POWER."

THE discourse under this title delivered to 4,000 of the working men of Sheffield, during the recent meeting of the British Association, by Prof. W. E. Ayrton, was less quoted at the time than it deserved to be. We print the concluding portion, referring chiefly to the production of light:—

Various calculations have been made as to the relative cost of lighting by burning coal to produce gas, or by burning coal to work dynamo machines for producing electric currents, and it seems to be pretty certain that if a large amount of light be required in one place, the electric light is at least twenty times as cheap as coal; Sir William Thomson, our eminent electrician, goes so far as to say that it may be made 133 times as cheap. And certainly that there is a great saving in expense in electric lighting is seen from the actual result obtained at the Albert Hall, London, which is an example, and perhaps the only example in connexion with electric lighting, where the science of putting a brilliant light high up has been allowed to ride over the precedent of putting a number of feeble glimmers all over a building. Now, the duration during which the electric light is used at the Albert Hall on any one evening is only three hours, the time of the performance, so that the cost of getting up steam before the light is used, and the waste of heat after the engine is stopped, constitutes an important part of the whole expenditure. However, including this and other disadvantages under which Dr. Siemens labours in this matter, the actual cost, including labour of men, allowance for wear and tear of machinery, &c., is only one-third of that of the former inferior gas-lights, and thus a saving of about 1*l.* 10s. an hour has been effected. And in addition to this money economy, a great and almost unexpected gain has been attained. For the smaller amount of noxious gas produced in the electric arc, than in burning the necessary amount of gas to produce even an inferior light, makes ventilation at the Albert Hall, London, now a less important question. And the smaller amount of heat at present produced causes less draught, so that taking the two things together the air is much more steady. But steady air of uniform temperature is very transparent for sound, while layers of air of unequal temperature are opaque to sound. Consequently this stillness of the air, arising from the use of the electric light, enables the singing and music to be better heard, an advantage of enormous importance in so gigantic a concert-hall. As a striking contrast with the delightful coolness of the air at the Albert Hall, London, was the warmth of the brilliantly gas-lighted ball-room at the Cutlers' Hall on Thursday evening, and which was only surpassed by the warmth of the reception offered to the British Association by your Master Cutler.

Lighting streets by electricity has not been so successful, economically, for the simple reason that instead of having a large bright light, at a considerable height, reflected downwards, as in the Albert Hall, London, English conservatism has prevented the authorities from grasping the possibility of using for street illumination anything differing from an ordinary iron lamp-post. But there can be little doubt that if a few large electric lights, high up, were used for street illumination, the same sort of result as has been obtained at the Albert Hall would be arrived at. And in connexion with the general illumination of a town by electricity, there is this important fact to be borne in mind, that all experiments lead to the result that the larger are the dynamo machines used for producing the electric light, the cheaper is the light produced per horse power. For example, with this smallest Siemens's machine, which I have on the table, one-horse power gives 600 candles, whereas with the larger machine, such as we are running backwards for driving our emery wheel, circular saw, &c., one-horse power gives 1,500 candle power, more than double the light furnished by the other machine; and it is said, although I cannot vouch for the fact, that with the very large machines used in lighting the Palais de l'Industrie in Paris, 6,000 candles were obtained per horse power. At any rate, we may be absolutely safe in saying that the cost of using gas in Sheffield for lighting large halls, such as the one we are now in, factories, and the streets could be halved if electric currents, generated by water-engines worked by hill streams, as well as by very large steam-engines, were substituted for gas.

But can this be quite right, for I have proved that to transfer energy economically we must use a large pressure and a small flow? Now, how can we produce a very bright electric light with a small current? Why, by not using the current that comes along the wire to produce the light at all, but merely to drive an electro-motor, which motor, at the place where any large amount of light was required, would be employed in giving motion to a second dynamo-electric machine, which would produce the currents for lighting purposes. This experiment I might show you, but as we have used already several times during the evening electric lights fed from a distance, we will vary the experiment and try an analogous one. Messrs. Walker & Hall will now, at their works, give rapid motion to a dynamo machine, and the current which, when properly arranged as I have explained to you may be small, will set in motion this electro-motor. This in its turn will cause this other dynamo machine to rotate rapidly and produce a current, which I will use for rapidly gilding this piece of plate.

It is not necessary for me,—and, in fact, time would not allow me,—to tell you how I propose to employ the electric light to illuminate private rooms, if only I can get people to throw away the notion that to light a room we must have something with a globe on it, like an oil-lamp; nor is it necessary for me to remind you that by whitewashing the walls, yes, by whitewashing even the very machines themselves in some of the Paris factories, the supposed strong shadows cast by the electric light have been less than the strong shadows cast by another bright light, one that we not only put up with, but one that from the force of habit we are tolerably contented with, viz., the sun. At present, I am concerned with the pounds, shillings, and pence question, which has more than usual weight in these days of slack trade. Well, then, assume the cost of gas used for lighting the large buildings, factories, and the streets of Sheffield can be halved; also, that where it is used for heating purposes the expense can also be halved, by substituting electric currents generated by very large steam-engines at certain points, and by turbines driven by falling water out of the town; then you would save per year about 45,000*l.* Suppose, also, that the cost of producing motive power can in the same way also be halved, this represents an annual saving of something like 60,000*l.* In reality, I believe this last economy would be larger, since not only could power be produced so much more economically than by small steam-engines or even by a large engine, when a large proportion of its power is, as now, wasted in driving the shafting alone in your factories; but, in addition, much hand-work could be economically replaced by machine-work. And, lastly, suppose the consumption of coal in Sheffield for heating your metals and for heating your houses could also be halved, then there is another saving of about 300,000*l.* a year; or, altogether, the annual saving that might be produced in this town alone, by substituting electricity for coal, would be something like the large sum of 400,000*l.* It is hardly necessary for me to point out to you how much capital a company would be willing to advance for such a comparatively certain profit yearly, or whether a large portion of this saving could not be effected by expending only a portion of this capital. But I think I hear you saying this is all very nice, but there must be certainly something wrong in it all; is it likely that Sheffield could save 400,000*l.* a year by merely using machines to whirl round coils of wire to produce electric currents? If that be the impression this lecture is producing in your minds, and I can hardly expect the more thoughtful to at once accept the truth of so novel a reform as I am here advocating this evening, and which probably you are listening to for the first time, allow me to adduce the following arguments to prove that although the reform is startling it may still be sound:—Imagine the cost of cutlery and plated goods to remain the same as at present, but all machinery to be removed from Sheffield, then what an enormous loss would accrue to the town from everything having to be done by hand labour. The saving, then, I am showing you how to obtain, enormous though it may be, is still small when compared with the gain that the introduction of machinery during the last hundred years has effected for this town.

Or, again, it may be objected that I talk of using water power at the hill-sides to drive turbines. But this water cannot come afterwards into Sheffield for drinking and other purposes, because to do work it must lose head. We must therefore waste at the source all the water we use for power. But has the Sheffield Water Works any water that can be thus dispensed with in the town? Assuredly, thanks to the energy and perseverance with which the Sheffield Water Works Company have conducted their operations, there is always in hand a very large stock of water. For instance, at present there is in the reservoirs at Redmires, Rivelin, Agden, Strines, &c., enough to last the town for six months if not another drop of rain falls (which is a far more unlikely occurrence than that every Sheffield manufacturer will speedily adopt electricity), and when the reservoirs at Damflask and Dale Dyke, now completed, but not yet in use, are employed, there will be at any time, I understand, a year's supply of water in the reservoirs, even if the consumption of Sheffield somewhat increases. Bearing this in mind, as well as the fact that the company has also power to construct two other reservoirs in the Ewden Valley, it will be seen that there is no lack of water, and I am sure there will be no lack of willingness on the part of the company to allow water at the source to be used, especially when such an arrangement can be made remunerative both to themselves and to the manufacturers.

As an example of what water-power can do, we will now cut a 2-in. board with a circular saw driven by an electric current produced by the water motor in the yard of the Water Company, and conveyed to this hall by the wires crossing the streets.

So much for what may be done by electricity in producing motive power. Now, let us consider what has been actually done. Last year, two French engineers, MM. Chrétien and Felix, at Sermaize (Marne), actually ploughed fields by electricity, the electric current being produced by two dynamo-electric machines, of a form invented by M. Gramme, and shown in the diagrams on the walls. These machines were usually worked with a steam-engine at some convenient place three or four hundred yards away in an adjoining road, and the electro-motors were also two Gramme machines, one on each side of the field, with their coils revolving, of course, backwards. Through one of these the electric current was sent alternately, so that motion was given to one or other of two large windlasses, one on each of the wagons containing the electro-motors. In this way the plough which could be used going in either direction, was first pulled across the field making a furrow, and then back again making another parallel furrow.

ROCK CONCRETE TUBES, THEIR MANUFACTURE AND USE.

THE following paper, by Mr. C. Fletcher Woods, was read at the last annual meeting of the Association of Municipal and Sanitary Engineers and Surveyors:—

In writing a paper upon this subject, it has been the author's aim to do so as a member of this Association, and he trusts that he will succeed in placing at the disposal of members that special information regarding the mode of production and the characteristic qualities of concrete in the form of sewer-pipes, which he has had such special opportunities of acquiring since he was engaged by Messrs. Henry Sharp, Jones, & Co. to superintend that branch of manufacture carried on at the Bourne Valley Works.

As a matter of fact, the process requires, from beginning to end, constant care and attention. In making concrete *en masse* the engineer knows well how much supervision is required. Much more so is this the case when, instead of a mass, a slight hollow tube has to be produced, which must be of great strength and without flaw. Faulty cement, dirty sand, soft aggregate, and careless manipulation are dangers to be guarded against with the utmost care, inasmuch as anything wrong may not otherwise be discovered until much material has been spoilt.

Sewer pipes of concrete have been made and used in the United States for the last thirty years. Among other reports from American engineers as to their use is one speaking of their having been laid in New Bedford as early as 1845, and of their still being found in perfect condition when since met with in the course of laying water-mains, and the American evidence generally is highly favourable to their use. The cementing material used in the United States has not, however, hitherto been the best that could be procured. A native production, the Rosendale cement, has been used, with a small admixture only of English Portland. This has necessitated the pipes being made of abnormal thickness; for instance, 9-in. pipes of 1 in. scantling, and 18-in. pipes of 2 in. scantling. The moulds first used at Bourne Valley were procured from America, and were facsimiles of the foregoing. An unwieldy article of this description would not have succeeded in England in competition with the vitreous stoneware pipes of Poole and Lambeth, by reason of the weight and consequent cost of freight and handling.

In this country Mr. William Buckwell, an engineer by profession, may be considered the scientific pioneer of the manufacture, and as early as 1849 he patented a process "for the manufacture of pipes and other structures of stone," which consisted in "condensing, solidifying, and compressing such matters by subjecting them to percussion in moulds." Another quotation from his specification illustrates the position which Portland cement then held as compared with the present day. He says,—"The cements I use and recommend are those containing a large quantity of clay, of which the Portland is highly applicable; but I prefer cement having a larger quantity of clay, and subjected to a larger amount of firing, as well as any of the limes suitable to withstand the action to which the structure is to be applied." Buckwell's principle of solidifying by percussion has not been improved upon up to the present day, but his mode of putting it into practice by means of steam hammers, and his process generally, appear to have been too slow and complicated for it to become of practical value; and though he carried out several successful examples of his work, which still remain, it was not sufficiently appreciated, and no more was heard of it.

To Messrs. Henry Sharp, Jones, & Co. belongs the credit of having first made the manufacture of Portland cement concrete pipes a practical and commercial success in England. That firm, already engaged in the stoneware pipe manufacture, took up the question of making pipes of concrete when introduced to them by Mr. J. W. Butler, now of the East Greenwich works, and started the patented American machinery which he had brought from the States. Various troubles and difficulties, of course, cropped up, but they were sufficiently overcome for the process to be shown, on Mr. Butler's behalf, in successful operation to the late Mr. James Hodges, a man of great and varied experience in the use of concrete, and the establishment of another manufactory at East Greenwich followed his visit to Bourne Valley. Such has been the introduction of concrete pipes into this country. The superior strength of concrete in the form of sewer-pipes, so much above what concrete has generally been supposed capable of attaining, is primarily the result of solidifying by percussion as projected by Buckwell, combined with a small and regular feed of material under the rammer, which part of the process he also made a point of, as important.

The exceptional feature in the manufacture of rock-concrete tubes is the nature of the aggregate, viz., broken vitreous stoneware, the ordinary waste of extensive stoneware pipe works. Mr. John Grant has pointed out, as a prominent result of experiments, that concrete made of broken pottery is much stronger than that made of gravel, and Table A, showing experiments made by the author on the 19th of this month for the purposes of this paper, is confirmatory.* By this it will be seen that the average shows an advantage of 25 per cent. in favour of the stoneware aggregate, and it will be noticed that the lowest breaking strain of the stoneware was better than the highest of the gravel mixture. These test-blocks were made in the usual course, the gravel being clean, and part of a few tons got in water-bearing strata in the neighbourhood, and of similar description to Thames ballast.

The combined manufactures of stoneware pipes and rock-concrete tubes, as carried on at the Bourne Valley Works, afford an excellent example of the utilisation of waste products. The stoneware is passed through a Blake stone-breaker, and then under edge-runners; the fine being at each stage intercepted and returned to the pottery to be again worked up in the manufacture of stoneware; while the coarse, now reduced to the size of pea-gravel, goes on to the rock concrete department. It is here mixed by machines with the other ingredients,—washed sand and a fine, heavy Portland cement specially ground from picked clinkers. Thence into the automatic feed of the tube-making machine,—a more powerful one than the American invention, which it has practically superseded at these works, seeing that for large tubes a heavy and regular blow is an absolute necessity, as is also a regular feed; while a hand-feed, however careful, can never be so depended upon as a mechanical one, regulated by the speed of the revolving mould, into which it delivers, and in which the runner or tamper is at work. The tube is thus built up on the coil principle, as a diagram of the blows given in the course of filling the mould would indicate. A continuous and intermixed coil would appear, and it may be reasonably assumed that construction in conformity with this approved method must enhance the strength of the tube. The mould being fitted, the spigot is formed by means of a heavy iron ring-mould, which, under heavy blows, shapes it.

Great care is necessary throughout the above process. The exact proportion of water is of much importance. It is easier to make and compact the tubes when an excess of water or sand is used, but the point aimed at is to make good tubes with the least possible quantity of either. All moisture beyond that sufficient to set up the crystallisation of the cement detracts from its strength, and, if in greater excess, is liable to weaken it by washing out the soluble silicates. The sand partakes more of the nature of an economical distributor of the particles of cement than of an aggregate, though to some extent it is an aggregate, as it helps to fill up the interstitial spaces that would otherwise exist. Still, it does not add to the strength of the concrete,—probably the reverse; the aggregate proper, broken stoneware, does. Very fine sand is excluded, as surrounding the particles of cement, and thereby separating them and preventing perfect cohesion, the mixing becoming granular.

The tubes, now finished, are placed on trucks, and run out to the hardening ground, where they remain twenty-four hours in the moulds, of which they are gradually divested, the outer casing being the last to be removed. After standing on end for a week or ten days, during which time they have been constantly watered, if the weather is dry, they are removed to the silicating tanks, from which, a week later, they go into stack, there to complete induration. A few words may be said as to the process of silicating, and its results. Messrs. Sharp, Jones, & Co. make their own silicate baths under Righton's patent, now the property of the Victoria Stone Company, the *modus operandi* being to dissolve at a temperature of 500°, the natural silica found in the neighbourhood of Farnham by means of caustic soda. The silicate of soda thus formed is reduced to the required dilution by the addition of hot water, 1,130 specific gravity by the hydrometer being the strength most suitable for the purpose. The silicate thus produced can be relied on as absolutely pure and of good quality. The tubes constantly absorbing the silica, the tanks have as often to be replenished, so that the silica in solution may be taken as constant. A steam-boiler serves to make the solution and to pump the liquid from one tank to another as required. As to the utility of the process, there is no doubt that it hastens very much the natural induration of Portland cement, but it does not penetrate far into the material, and the stronger it is the less it penetrates, the result being a temporary case hardening,—temporary, because it does not appear that any property is conveyed to the cement that would not eventually accrue by age. It benefits the manufacturers by enabling them to place their goods sooner in the market.

A detail of much importance, and to which great attention is paid, is the regular and continuous testing by tensile strain of the cement. Tests are first made in the usual way of each consignment of cement as it comes on the works, including the tensile test at seven days. Testing briquettes are also daily made of both cement and of the tube mixtures in which it is incorporated. All these are entered in the test-book, which records particulars of each parcel of cement, where it came from, and what becomes of it. Thus, should any defect occur in the manufacture, the cause can at once be traced to its source. These numerous briquettes are all kept, and tested from time to time as occasion requires. An instance of their use quite unanticipated when the briquettes were made is table A. The author contemplated compiling an elaborate series of tables from the records of these tensile tests, but on consideration he did not think himself justified in publishing such as the results of scientific investigation, when as a matter of fact the testing is merely a guide,—though a very valuable one,—to those engaged in the manufacture, and many seeming discrepancies would arise, which, though at once to be accounted for on the spot, would be difficult and tedious to explain in a paper. The author may, however, state as a general deduction that at the end of four months the concrete is not more than ten per cent. below the strength of neat cement, and that this difference continues with a tendency to diminish as the age of both increases. This favourable result must be, to a great extent, due to the inherent strength of the stoneware aggregate and the capital "bite" that it affords to the matrix. It should be mentioned that the test briquettes are not silicated, the object being to arrive at the value of the concrete on its own merits.

There is, however, a record kept at Bourne Valley of another kind of testing that must have a higher practical value to engineers. This consists in submitting tubes to a crushing strain under the hydraulic ram, the breaking-weight being read off the dial of a self-registering gauge. This machine is by no means in daily requisition, since the breaking of large tubes is costly, and not to be undertaken without a specific object. Still, seventy-six experiments have been made in this way, some of which the author recapitulated in tables accompanying his paper. The most noteworthy are the comparative experiments made by Messrs. Welman and Creeke for purposes of investigation connected with the Bournemouth drainage. It should be added that the stoneware pipes averaged 256 lb. in weight, and the rock concrete tubes 252 lb.

A feature prominently demonstrated by the individual experiments, and patent also to the experimenters in all tests made, is the great toughness of rock concrete tubes.

The density and impermeability of the material is apparent to the eye, and was also demonstrated by a table of experiments made by Mr. Henry Reid, showing absorption of moisture after *ten days'* immersion to average 1·7 per cent. addition by weight. The average absorption, after twenty-four hours' immersion, by stone

* TABLE A.

Showing difference in tensile strength between concrete made with washed gravel and with broken stoneware: age, five weeks.

	lb. per sq. inch.		lb. per sq. inch.
1 part of cement	170	1 part of cement.....	220
1 ,, washed sand...	160	1 ,, washed sand	193
2 parts of pea gravel ...	146	2 parts vitreous stoneware	230
Mean	161·6	Mean	210·6

ware and fireclay, as shown by a number of experiments given by Mr. Baldwin Latham, is 3·057 per cent.

Having described the general features of the manufacture, a few words may be said on the tubes as ready for sale, and the uses to which they may be applied. First, they are applicable to the construction of main sewers, and, without advancing for them the quality of marvellous strength, it may safely be said that, *ceteris paribus*, all experiments show them to be somewhat superior in this respect to stoneware pipes.

As regards durability, the concrete being chemically and mechanically as perfect as the finest selected cement and aggregates, and modern machinery can make it, this quality follows as a matter of course. Sir John Coode, Mr. E. Druce, and others have testified to the extraordinary powers of resistance to the action of attrition or abrasion possessed by concrete; and, as regards resistance to the chemical action of deleterious liquids, it would be mere waste of time to enter into argument in defence of its well-known qualities in this respect. Although at Bournemouth a sewer constructed of rock concrete tubes was found to have cracked longitudinally in consequence of the most ordinary precautions of engineering having been neglected, it does not come within the author's experience to have heard of a concrete sewer that has succumbed to fair wear and tear. Brick sewers have been thus worn out or eaten away, and the author, as a town surveyor, has had occasion to pull up many hundred feet of fireclay pipe sewers, which, although only laid for periods varying from six to seventeen years, were absolutely rotten. He was obliged to relay with others of a similar material, through motives of first cost, and which cannot last but a very few years. At Frome, in Somersetshire, fireclay pipes have been discovered in a like condition. It is not surprising that this should be so, for fireclay, as its name implies, withstands the action of the heat, does not vitrify, and pipes made from it have only the salt glaze to protect them from the destructive effects of water, to say nothing of the more deleterious liquid they are specially intended to convey. Stoneware, on the other hand, as made in Lambeth and Poole, is the product of clays that partially vitrify under the action of intense heat, and, as Mr. Reid has shown in experiments made upon the aggregate of rock concrete tubes for the Bournemouth Commissioners, may be subject to boiling hydrochloric acid without deterioration.

With the above-mentioned qualities of strength and durability, rock concrete tubes become a desirable material for the construction of large sewers. In the ordinary sizes of pipe sewers they can be used as stoneware pipes are used; for the larger-sized sewers they are simply invaluable as permanent cores or linings to an exterior casing or ring of coarse concrete, as described by Mr. Baldwin Latham, and used by Mr. Ellice-Clark and other engineers. This mode of construction is less than the cost of sound brick sewers of the same diameters; in addition to which, the perfectly concentric form and imperviousness, the saving of centering, and the possible rapidity of construction and fitting in the trenches immediately after, show them to possess great advantages over other modes of making such sewers. As a rule, the sizes made at Bourne Valley, and generally kept in stock, are from 15 in. to 36 in. diameter, the process of manufacture not being adapted to the economical production of small tubes; and here stoneware pipes cannot be competed with.

The joint has been objected to as too short to allow of settlement, and the same objection has been raised to the Stanford patent joint. Doubtless, such objection holds good if a rigid sewer is to be laid on a shifting bed, but when the pipes are enveloped in concrete or laid thereon, as any sewer, pipe or brick, should be if the ground is bad, this objection is no longer a valid one. The jointing is easily and perfectly effected with Portland cement, the material being specially adapted to it. In the 15 in., 18 in., 21 in., and 24 in. diameters, provision is made to effect a good joint round the outside; with the larger tubes there is room to make the joint inside as well as outside.

In view of using the tubes in watery ground, the author has been making experiments with a mixture of boiled tar, pitch, and plaster, whereby the water is excluded for a sufficient time for a cement joint to be made and to set inside the tubes, and he has attained a fair measure of success.

Mr. Ellice-Clark's experience in the use and behaviour of the rock concrete having been considerable, and he, in addition to constructing sewers with the tubes, having used them for man-holes and ventilating shafts, will perhaps give his opinions on the subject. Mr. Cregeen, of Bromley, and Mr. Stow, of Frome, may also be mentioned, among others, as having used the tubes with success and satisfaction. Two or three wells have been constructed with them 30 in. and 36 in. diameters, one being 44 ft. in. depth. At Bourne Valley they are used for water-tanks, and also for a hydraulic balance lift, the cylinders being 12 ft. in depth by 18 in. diameter.

The author hopes that these few facts which he has been able to compile relating to a new industry may be found of interest and profit to the municipal engineers and surveyors of this country.

CHURCHES IN AND NEAR BRIGHTON.

SUSSEX ARCHÆOLOGICAL SOCIETY.

For the second time, but after a lapse of thirty years, the Sussex Archæological Society has visited Brighton and the neighbourhood. On the 27th ult.

St. Nicholas Church was visited, and a paper was read by Mr. Somers Clarke, jun., on the fabric and its history. Having referred to the opinion expressed by the late Mr. Mark Antony Lower that St. Nicholas Church occupied the site of a Druidical temple, Mr. Clarke said the church as they now saw it stood in Brighton, but those acquainted with the town knew that till very recently it stood out of Brighton. History told them, and the remains of building proved it, that years ago a considerable population lived below the cliff, and they might naturally ask how it was the church was so far removed from its parishioners. To that question he had never heard any satisfactory answer; and, though he did not profess to unravel the history of the building, he imagined that the choice of site was of comparatively recent date. They knew that the whole coastline from Shoreham Harbour to Brighton had been constantly shifting, and why should not some such change, say in the fourteenth century, have so alarmed the inhabitants beneath the cliff as to induce them to remove their parish church quite behind the upper town? When a church had been altered, enlarged, and rearranged on its original site, it was very seldom that some of the changes could not be traced or a part of the original building found. But here, on the other hand, they found some very early work in the font, whilst the rest was of the fourteenth, fifteenth, and nineteenth centuries. All the neighbouring churches out of the town showed signs of high antiquity. Why were there none here? Without pursuing this point further, Mr. Clarke went on to say that the building comprised a nave, with aisles north and south, separated from it by an arcade of five arches constructed of yellow stone from the other side of the Downs, a tower at the west end, and chancel at the east. This seemed to be the original fourteenth-century design of the building. The aisles were, until 1853, some 6 ft. narrower than at present, and the north aisle ended westward on a line with the east face of the tower. The windows were, however, apparently such as they now saw them. In the fifteenth century the south aisle of the chancel was built, and in that century the singularly rich screen must have been erected. Passing on to a more detailed account of the building, with a reference to some of the internal changes, of a temporary character, Mr. Clarke pointed to the site of the pew in the north gallery where Dr. Johnson was wont to sit when on his visits to the Thrales, at Brighton; and also adverted to the efforts of the late vicar, the Rev. H. M. Wagner, to improve the condition of the church. The vicar (said Mr. Clarke) proposed to widen the aisles considerably and cover them with gabled roofs, also adding large aisles to the chancel. The parishioners, however, remained obstinate, and, although a monition was served on the churchwardens from the Archdeaconry Court of Lewes, nothing was done, as a church-rate could not be obtained. On the 17th of May, 1852, the last endeavour was made to raise the necessary church-rate, but in vain. At the end of this year, the Duke of Wellington having lately died, a meeting was convened and a proposal was made that the restoration of the church should be taken in hand as a memorial to him, the church having been his place of worship when a pupil with the Rev. H. G. Michell, who was vicar at the end of the last century. The proposition was unanimously adopted, and the subscription was commenced with the sum of 1,000*l.* by Mr. Wagner. The church, as they now saw it, was the result of that movement. The Ven. Archdeacon Hannah succeeded to the living in the year 1870, and caused the organ and inclosing screen to be erected, since which time the stalls, panelling to the walls of the sanctuary, and the reredos had been added. Mr. Clarke concluded by giving a detailed description of the font, which he attributed to the eleventh century.

Alderman H. Martin observed that he had found in the Domesday Book that the spot on which the church stood was the site of a religious house, and remarking that he had found no instances of sepulture in the churchyard prior to 1600, said there could, he thought, be no question that the original parish church was that of St. Bartholomew, which formerly stood where the present Town-hall now was, and where, in digging out the foundations, ample evidence of many burials was found.

At *Rottingdean Church*, Mr. Gordon M. Hills, architect, pointed out the features of the building, observing that, though the church was not mentioned in Domesday Book, there were traces in it which indicated that it must have existed at the time of the Conquest. Thus, they had a large nave, a small space over which the tower stood, and then the chancel,—features which were common in the Norman period and uncommon afterwards. He, therefore, thought that the building was originally a small Norman church, with a nave and presbytery, and a circular apse beyond, for he had been able to detect a starting in the wall as if it had taken a circular form. He did not think, therefore, that they would be far out if they believed the church stood there at the time of the compilation of the Domesday Book. Its other features were Early English, the tower being of that date and the chancel for the most part of the same period. Forty years ago, the church had no south aisle, for though the arches were there, they had been blocked up from time immemorial. These, about twenty-two years ago, were opened out and the aisle added, and the church had undergone further restoration later on. The arches under the tower and the windows in the tower were Early English and of lancet form.

Ovingdean Church was also described by Mr. Hills. It was, he said, an almost perfect specimen,—perhaps as perfect as could be found anywhere,—of a church built before the Norman conquest, though they could not say the whole of it was of that date, as it had been subject to alterations in after times. A church at Ovingdean was mentioned in Domesday Book, and there was pretty positive evidence that this was the place referred to. Shortly after the Conquest, it became the property of the great Monastery at Lewes, which belonged to the Benedictine Order, then at the height of its power. The Monastery of Cluny in Burgundy had had the good fortune to be under the direction of three abbots, each of whom controlled it for the remarkable period of fifty years; and, being men of great talent, rectitude, and piety, they gave the Order an influence which it never afterwards attained. The Cluniacs were remarkable, not for establishing new monasteries, but for reforming and restoring those establishments already in existence; but it was not clear that they did anything for this little church. It came into their power soon after the Norman Conquest, and being treated in a conservative spirit, it remained very much as it was until 1200, when the tower was added at the west end and an aisle to the south side, both of which were probably the result of the munificence of the great monastery at Lewes. Subsequently, the aisle appeared to have made the church too large, and it had been suffered to fall into decay; the arches being then walled up as they were now found. The church comprised a small chancel, lighted by three tiny Norman windows, and an almost perfect chancel, of a period of work before the Conquest, whilst on each side of the altar were some remarkable recesses, rarely, in his experience, found except in pre-Norman churches. They were intended for the reception of the sacred vessels; and at Sompting similar places, worked with early sculpture, were also to be seen. Originally, the nave opened into the chancel by a single arch, the centre one of the present three being the original. The others were accounted for in another way. The fact

was, church restorers sometimes puzzled archæologists; and Mr. Freshfield had told him (Mr. Hills) that he traced in the existence of the three arches a connexion between the Church of England and the Church of the East, where the triple form was usual. Unfortunately, the truth was that, as the single opening was not deemed sufficient, two others were made in a rough way 200 years ago, and, when the church was recently restored, they were finished off in a more shapely form similar to the centre one. Mr. Hills also drew attention to the original Norman door in the nave and the original Norman windows, and, referring to the latter, said it was interesting to know that the painted glass in them was the work of a native of Ovingdean, Mr. Kemp.

The Vicar of Ovingdean (the Rev. Mr. Stead) who had pointed out the features of the church previously to Mr. Hills's arrival, supplemented that gentleman's explanations by observing that the large arch near the tower was of chalk. The disappearance of the south aisle he attributed to the ravages of the French and Burgundians in the time of Richard II., remarking that those forces, on landing at Rottingdean, fought the Prior of Lewes, took him to prison, and then set fire to the church there; and it was not unreasonable to suppose that, as Ovingdean was only a mile off, they might have served it the same. The presence of fire-marks on the stones of the arches, similar to some found at Rottingdean, and of some charred wood close by, supported, in his opinion, this not unreasonable theory.

SUSSEX CHURCHES.

AT the annual meeting of the Sussex Archæological Society, held on the 27th ult. in Brighton, the Ven. Archdeacon Hannah read a paper on "Sussex Churches."

Sussex, he said, must yield the palm to other counties if people searched for nothing more than stateliness and splendour in its churches, but if it were asked what they could learn from Sussex churches, he would reply that they taught and illustrated the origin and the development of Gothic architecture almost as clearly and completely as those of any district in England. There were many points of interest in the ecclesiastical history of Sussex: its early seclusion; the late date of its conversion to Christianity, three generations later than that of the neighbouring kingdom of Kent; the removal of the bishopric after some centuries from Selsey to Chichester; the coincidence in the boundaries of kingdom, shire, and diocese from the very earliest to the latest times; the close relations which afterwards grew up between this diocese and the arch-diocese of Canterbury; the powerful religious houses at Lewes and Battle, with the numerous less prominent foundations at Michelham, Robertsbridge, Wilmington, and other places; and the occasional connexion of our ecclesiastical establishments with religious houses across the Channel. But it was often only through the medium of scattered and comparatively insignificant ruins that we could spell out the local records of a great historic past. Sussex, too, had suffered much at the hands of both man and nature. Her churches had been sometimes burnt by the Frenchman, sometimes swallowed up by the sea. They looked in vain for the remains of that original foundation at Selsey, or the older parishes of Hastings; and it had been thought that the scorching of the hostile flames could still be traced on the stones of the churches of Rye and Rottingdean. In the larger towns their very novelty told against them; for there could be few old churches where there was scarcely any ancient population; and hence a town like Brighton afforded but a barren field for the antiquary, as compared with some of the smallest of older cities of the county.

Taking for his first instances, churches where the architectural interest was concentrated on a single style, the Archdeacon referred to the churches of Sompting and Worth, as two examples where the tower of one and the walls and ground-plan of the other were especially instructive relics of that archaic style that preceded and slightly overlapped the date of the Conquest. Both showed good specimens of the "long-and-short" work, the timber-like flat pilasters, the small ancient windows, and the masonry of a rude and primitive character, which passed out of use under the influence of the more ambitious, if not abler, Norman builders. At Sompting, besides a number of instructive details, and excellent examples of both pilasters and long-and-short work, the tower had the advantage of retaining the original top; each side ending in a gable, and the gables being roofed together in a point above, like the churches so often met with on the Rhine. At Bosham, on the other hand, they had a village church which could be made a sort of primer of architecture, for its walls had been altered and amended in the style of each succeeding age. The little village round that church, as Mr. Stephens says, "was connected with important, sometimes tragical, events in the reigns of Canute and Edward the Confessor, and in the lives of Earl Godwin and Harold. It is one of the four or five places which alone are marked in the oldest maps of Sussex. It is depicted in the Bayeux tapestry as the place whence Harold embarked on the ill-fated voyage which ended in his wreck on the coast of Normandy, and his detention at the court of William." But, centuries before the days of King Canute and King Harold, "it demands our attention as the one spot where Christianity had a home, when all the rest of Sussex was wrapped in heathen barbarity and ignorance." His excellent friend, the present Vicar of Bosham, had given reasons for believing that his church stood on the site of a Roman Basilica; namely, that bases undoubtedly Roman have been discovered at the foot of the piers of the chancel arch; and the facts that the "remains of a Saxon window may be seen on the north wall," that "the chancel was lengthened" in the Norman period, that a Norman window recently opened, and the presence of a piscina belonging to the Norman altar, record another stage in the history of the fabric. An Early English character was given to it at the end of the twelfth century by Bishop Warelwast, of Exeter, who again lengthened the chancel, added north and south aisles, and introduced Early English windows. A church like this reminded them of a palimpsest, in which one style crossed out and obliterated another, till modern skill read the riddle, and re-interpreted the stratified records of the past. Traversing the county, to Battle, they found in the well-restored church of St. Mary a Norman arch built in the south wall, near the chancel, whilst the nave was Late Norman, and the clearstory Early English, there being also some beautiful Early English arcading in the chancel itself. The north aisle was Perpendicular, and the west door Early English, beneath the inevitable Perpendicular west window of the later tower. At Rye they could study the same stages in the unrestored form. After saying a few words in defence of the judicious restoration of decaying churches, the Archdeacon proceeded to advert to a tour that would comprehend a series of interesting churches. A walk along the valley of the London-road from Brighton northward took them past the three village churches of Preston, Patcham, and Pyecombe, each with some points of interest; and they could go on past Clayton and Keymer to the remarkable and instructive church at Ditchling. From the Devil's Dyke they could drop down on the cruciform fourteenth-century church of Poynings; whilst on the road to Shoreham they passed the Norman tower of Southwick, and at Shoreham itself there was a rich store of instruction in Norman and Early English to be drawn from both the parish churches. Or they could take the train to Three Bridges, and a short walk round would lead them to Worth, Crawley, and Ifield. Go thence a little further eastward, past West Hoathly, to the decidedly unrestored Church of Horsted Keynes, with its memories of the low sweet voice of Leighton; and from thence, again, if they had two or three days to spare (for the distances are long), they could wander on, from church to church, through lovely broken forest land, till they emerged from the county at Tunbridge Wells. Then, turning southward and eastward, they found a perfect treasure of church architecture, including the late Decorated Church of Etchingham, once "amongst the noblest of baronial churches," down to Icklesham, and Rye, and Winchelsea. From thence the railway would bring them back to Brighton, past Hastings, and Bexhill, and Pevensey, and Westham, with their ancient fortresses and churches. Another expedition could be made by taking the railway to Eastbourne, to examine the old church there, and walking back over the Downs, they would find many an old village church nestling in the coombes,—here and there one of higher pretensions, like Alfriston. From Seaford they could turn inland towards Lewes, by the side of the Ouse, taking particular note of the lovely churchyard at East Blatchington, and the tower of Bishopstone, and then pass across the stream, to inspect the three round towers of Piddinghoe, Southease, and St. Michael's, Lewes, the relics of an economical antiquity. There were plenty of collateral points of interest in the monumental tombs and brasses, and he could only finish by urging all of those present to join in the work of studying their old churches, with a view to their better preservation. Let them make it a principle neither to destroy any genuine honest work that could be retained without public detriment, nor to try to impose a crude raw novelty, by mending some time-worn form of interest and beauty. In short, reverence for ancient work and modesty in repairing it were the plain and simple rules that would protect them from any serious errors in completing the restoration of the Sussex churches.

BERKSHIRE ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY.

ON the 3rd inst. the members of this society went on an excursion from Reading to Hagbourne, Cholsey, North Moreton, and Wittenham.

At *Hagbourne*, the parish church was described by Mr. James Parker, who thought that the name Hagbourne was derived from the burn or brook of Hæcca, as was shown by one of the charters in the Codex Wintoniensis, of the twelfth century. In one of the Abingdon chronicles, dated 944, the name was spelt Haccan broc, and in 964 it was written Hæccebroc—broc or burne being equivalent terms for an intermittent brook. He thought the Hæcca was a proper name, and did not attach much importance to it. In the Domesday survey the *burne* became *borne*, equivalent in the Norman to a boundary, and they found in the survey that there were two manors bearing the name of Haccheborne. One was held by Walter Fitz-Other, and the other was held by Rainbald of Cirencester. It was stated in the survey that Rainbald held the latter manor in the reign of Edward the Confessor, so that it was not confiscated, as more than nine-tenths of the ecclesiastical property was at that time. Rainbald was Chancellor to Edward the Confessor, and was dean of the rich colleges of prebendaries at Cirencester, and he died before 1117, in which year there was a charter by which Henry founded the monastery of Cirencester. During the twelfth century, in nearly all cases where there were secular canons, regular monks were put in their place. That was probably not till Rainbald's death, as all his estates went to endow the newly-founded abbey. There was not now a vestige of the twelfth-century work in the church. It was most likely originally a small church, probably exactly the size of the present nave; but the whole had apparently been re-built. He thought the chancel arch, and parts of the nave, might fairly be ascribed to about the year 1200. Alexander Necham was Abbot of Cirencester down to about 1215, and was just the sort of man who would look after the property belonging to the abbey. In the reign of Edward II., the church not being large enough, the chapels were built. Lysons said the north aisle was built by John Yorke, who died in 1413, and who had a brass to his memory in that aisle; but the brass belonged no doubt to the south aisle, which was most probably founded by him, about 1413; and the north aisle was most likely founded by Claricia Wyndesore, in 1403. The eastern part of the present south aisle was of that date, the western part being about ten years later. The large tower was somewhere between the two; but it was difficult to ascertain its exact age, as the arch had probably been rebuilt and the old material worked in. The roof was probably raised, and the clearstory windows put in, at the time the tower was rebuilt.

At *Cholsey* the company assembled in the cruciform church, formerly belonging to Reading Abbey, and Mr. James Parker gave an address, in the course of which he said they possessed in Berkshire a larger number of charters relating to lands before the Conquest than could be found in any other county. Exactly as was the case at Hagbourne, there was not the slightest doubt as to the final syllable of Cholsey, but there was considerable doubt as to the first syllable. Before the Conquest there was only one way of

spelling Cholsey, viz., Ceol's-ige, or Ceol's island, perhaps more properly a tract of land surrounded by water. It was spelt Ceolsige in the Domesday Survey. Ceol might have derived his name from a ship, or "keel," and there was no doubt that the village ought etymologically to be called "Keelseye." In the year 950 Cholsey and Reading were joined together in the bequest of Alfræd; and the great interest the party of that day would feel in the church was in its connexion with Reading. They found in 993 a charter of King Ethelred, granting to his "venerable mother," Ælfthrith, certain lands in return for "the land which she first gave me, that is Ceolsig," or Cholsey. In the Domesday Survey they found that Cholsey belonged to the Royal Family. Henry I. wished to found an abbey at Reading, and he fixed upon three ancient churches, if not abbeys, to endow it; and those churches were most likely served by secular canons. In order to augment the funds sufficiently to support a large body of regular clergy, Cholsey and Leominster were added to Reading. Any one would say that the tower of that church, with its simple recessed arches, was of the time of Henry I., and no doubt the first thing the monks of Reading did when the land and everything belonging to it were granted to them, was to build the church. About a year and a half ago, in the south-east corner of the tower, he saw some very rough, rude masonry, quite different to everything else in the church; but now that the church had been restored that was absolutely gone, and he particularly regretted the fact, because he believed that piece of work dated back to before the Conquest. He thought it was clear, however, that the church actually occupied the site of the church which was there before. Equally he felt sure that originally each limb of that cruciform church was of the same size. It might not be going too far to say that the monks were so pleased with their church at Reading, which they were then building, that they decided to imitate it at Cholsey.

North Moreton was next visited, and after luncheon the party visited the church, where, in the Stapylton Chantry, a paper was read by Mr. Henry Stapylton on the history of the parish. Mr. Stapylton said that any one might have supposed from the beauty of the design that those buildings were the work of some great monastic establishment, or were in some way connected with the royal castle of Wallingford, but there was no reason for supposing either to have been the case. He thought he should be able to prove that the church (or, at any rate, the chancel) and the chantry were the work of two private persons, each animated by one common motive, that of commemorating a deceased relative, perhaps with the hope also of securing grace for themselves and the souls of their friends, both dead and living. In determining the date of the buildings, the fact that both were in the Early Decorated style, and connected by Early English arches, seemed strong evidence that they were built at the same time, —just when the Early English was first merging into the Decorated. The chantry, at any rate, was already built in 1299, and he believed there were few specimens of the Decorated style in England earlier than 1290; so they would not be far wrong if they fixed the date of both chancel and chantry in the last decade of the thirteenth century. The earliest mention of the chantry was contained in an inquo ad quod damnum of the 27 Edw. I., held before the king's escheator, in full assembly, of the county of Berks (in pleno comitater Berks) the 16th of March, 1299:—"To ascertain whether any loss or injury would resort to the king if Milo de Stapelton were allowed to give and assign one messuage, one vigate of land, and two acres of meadow in North Moreton to the chaplains and their successors to celebrate mass daily in the chapel of St. Nicholas there."—Inq. a. d., 27 E. I. The jurors found there would be no damage to the king, but only to the Lady Joan, widow of William de Vallence, of whom this messuage and land were held, with other holdings in North Moreton, by service of one knight's fee. From that they learned that the chapel of St. Nicholas was already in existence in 1299, and that Milo de Stapelton held his estate there under the widow of De Vallence. He thought they would come to the conclusion that it was to the piety of those two persons that they owed the [church (or, at least, the chancel) and the chantry. Lady Joan's husband, William de Vallence, was one of those needy foreigners who flocked into England in the reign of Henry III. In fact, he was half-brother of the king, King John's widow having married the Count de Marche of Poitou, after the death of her first husband. They had a numerous family, and on the Queen dowager's death (1264) their children were sent over to England to thrive under the protection of their royal half-brother. William, the third son, was at once made Governor of Goodrich Castle. Several anecdotes related by Dugdale represent him as hard-drinking, mean, and unscrupulous,—no uncommon character in those days. Nevertheless, he was always faithful to the king, and helped him much to win the battle of Evesham. His wife was the Lady Joan, only daughter of Gwarin de Monchensi, one of the most noble, wealthy, and prudent warriors of his time. Camden called him "the Crœsus of England, his will amounting to above two hundred thousand marks." Lady Joan was, he believed, the founder of the church. She was lady of the manor; she was rich, and the death of her husband in a distant land might have been her motive. There was much less difficulty in identifying the builder of the chantry. Milo de Stapelton, mentioned in the Inq. ad quod with which they began, was the head of a family settled at Stapelton-on-Tees from a very early date. The theory he endeavoured to establish was, that Sir Miles de Stapelton, the son of one Sir Nicholas and the grandson of another, had an elder brother of the same name, who was a Templar, but died early, before his father; and it was to his memory that Sir Miles built the chantry at North Moreton. Mr. Winston, who restored the windows in 1856, and who was an authority on the subject of glass-painting, fixed the date of the glass between 1300 and 1310.

At *Little Wittenham*, the site of an ancient British camp, Mr. James Parker gave an address, in the course of which he called the attention of the party to the two mounds between Dorchester and the river, and explained that one-half of the ridges had been carted away by a farmer. He believed the destruction of those mounds was really the beginning of the effort, which was not yet successful, to obtain a Government Commission for the preservation of ancient monuments. Those two great ditches and mounds, half of which had been destroyed, were undoubtedly Roman. As nearly as could be, the Romans always attempted to obtain a parallelogram in their encampments, but one of their rules was that whenever they encamped by a river they had to cut a loop, as it were, exactly as they had done there. That was absolutely unlike any other mode of fortification of that early period.

After a brief glance at Little Wittenham Church, the visitors drove through Long Wittenham to Didcot, whence they returned to Reading and Maidenhead.

THE HALIFAX COMMERCIAL BANK.

THE new bank, now being erected for the Halifax Commercial Banking Company, occupies a prominent position at the angle formed by Silver-street and Crown-street, and has three frontages to these streets. The site, though an excellent one, is of somewhat irregular shape, but the plan has been so adapted to it that a regular and convenient structure will be arranged. The ground-floor space is occupied entirely by the office of the bank, and the directors', manager's, and waiting rooms. The office itself will be a room about 40 ft. by 38 ft., and 18 ft. high. It is placed at the prominent angle of the site, and is lighted on three sides by ten windows. The approach to the office is by a porch opening from Silver-street, giving easy access to the banking-room, and protecting it at the same time from draught. The bank will be lined with a dado in American walnut, and all the fittings and furniture throughout will be in the same material. The basement contains the rooms for the curator, the strong-room, and voucher-rooms, and dressing-rooms, lavatory, &c., for the clerks. A hydraulic lift communicates between the banking-room and the basement for the easy removal of books. A separate wide staircase and entrance have been provided in Crown-street for the use of the first and second floors, which are arranged, with wide, well-lighted corridors, in suites of offices. Those on the first-floor for the principals, and small private staircase communicating with the second-floor for clerks' offices. Separate lavatories and coal-places are provided to each suite of offices, and these rooms are all excellently lighted by the windows on the three sides of the building. Great care has been expended upon the arrangement of these offices, which will be well adapted for lawyers and other similar occupations. The exterior of the building has been treated in a free adaptation of Lombardic Gothic. The ground-floor windows are wide single lights with double shafts to the reveals, pointed arches, labels, and sunk panelled dados. The first-floor windows are double lights with double shafts and quatrefoil tracery in the heads. The second-floor windows are clustered single lights. Those to the principal front looking down Silver-street are five in number, over three windows below. The building is crowned by a bold cornice and perforated parapet, above which are large stone dormers, with double shafts to the front and single shafts to the reveals, in two lights, with moulded tracery to the heads, and an enclosing arch. The different angles of the building are finished with pinnacles, and the grouping of the whole, with the lofty high-pitched roof, with wrought-iron cresting and finials, will be picturesque. The mason's work is being executed by Messrs. John Ives & Son, of Shipley; Messrs. Charnock & Son, of Halifax, are the joiners; S. W. Whitaker, of Bradford, is the plumber; Messrs. Bancroft & Son, of Halifax, are the plasterers; and W. Lee & Son, of Halifax, are the painters. Messrs. Farmer & Brindley, of London, are the carvers; Mr. Slater, is the clerk of works. The amount of the contracts is 8,300*l.*, exclusive of land and furniture. The building has been carried out from the designs and under the superintendence of Messrs. W. & R. Mawson, architects, Exchange, Bradford.

THE NEW WHOLESALE VEGETABLE MARKET AT STRATFORD.

THE spacious new wholesale market for vegetables which the Great Eastern Railway Company are erecting, as we have already mentioned, immediately alongside their station at Stratford Bridge, is intended more especially for the convenience and accommodation of the dealers and the inhabitants generally of the East End, to whom it is expected that it will serve the same purpose as Covent-garden now affords to the metropolis as a whole. It will not only be supplied with produce from Essex, which is essentially a vegetable and root-producing county, and which the Great Eastern line intersects at various points, but supplies are also expected from the Continent by the Great Eastern Company's steamships trading between Harwich and Rotterdam.

The market will be 480 ft. in length and 50 ft. in width, thus covering an area of 24,000 superficial feet. It is 30 ft. in height from the ground line to the eaves, and will be covered in by a roof, in two bays, about one-half of which will be in glass. The roof will be supported by light ornamental iron girders. One half of the entire area of the market will be divided into warehouses. These warehouses will be eight in number, each warehouse being 240 ft. by 60 ft. They will contain platforms, raised considerably above the railway level, two lines of rails from the main line of railway being carried along the entire length of the south side of the market immediately in front of the warehouse platforms. On the arrival of the trains with the various descriptions of vegetable produce for sale, the produce will be received from the trucks and taken into the warehouses, where the business of the market will be carried on. There will be a separate entrance to each of the warehouses on the north side, and a large open space immediately adjacent, belonging to the company, will be appropriated for the arrival and departure of vehicles with the market produce. The materials of the market are yellow brick, with stone coping.

It has been designed by Mr. Langtry, the company's engineer. Mr. W. Bangs is the contractor, and Mr. Selvey clerk of the works.

Leeds.—The new Convalescent Home recently erected at Meanwood, near Leeds, was opened on the 30th ult., by the Bishop of Ripon, and Miss Beckett, of Somerly Park. The building will accommodate about eighteen children, and is pleasantly situated in the high road between Meanwood and Moortown, having a frontage to the south, east, and west aspects. The building has been erected by the late Mr. Moxon, of Headlingley, from plans prepared by Mr. John Birch, architect, London.

DESTRUCTION OF WORKS OF ART IN ITALY.

MR. CHAS. HEATH WILSON, now resident in Italy, has come to the support of "Ouida," in the *Times*, in her properly indignant protest against the destruction of works of art in Italy. In closing his letter, Mr. Wilson says:—

"My concluding statements shall be those of an Italian lover of his country's monuments. In Genoa, the Church of St. Sebastian, with its frescoes by Piola and other Genoese masters, has been razed to the ground to make a street straight. The architecture was of little value. The misery of these proceedings lies in the destruction of paintings which no modern artists can reproduce. It is said that the old Bank of St. George, that central point of Genoese history, associated also with European history, is to be cast down. Up to the present time the indignant protests of intelligent men have prevented this; but my informant had little hope of its being saved. The unequalled Terrace-garden, with fountains of the Palace of Andrea Doria, is to be cut through by the harbour railway. My Italian friend spoke of this with distress and shame. It will be not only to offend taste, but to destroy a monument intimately associated with the history and glories of Genoa. This once magnificent city is being disfigured in every way by hideous modern erections. The decay of all taste and sentiment, of all pride in its beauty, is apparent; every promontory, and every point of vantage, are now covered with monstrous piles of building which in ugliness have no rivals. The calm allusion in one of your correspondent's letters of the possible destruction of the Farnesina, makes the blood run cold. There is not a shadow of proof that such an act would improve the health of Rome or save one life. But we may console ourselves, such a deed as this never will be proposed. In their schemes for the improvement of Italian cities, which have been hurried on with such reckless haste that many of them are involved in hopeless debt, municipalities and engineers may yet show their taste and ability by so laying down their plans as to preserve the monuments which have made their country famous. If they do otherwise, they must be content to bear the indignant censure of civilised Europe."

THE BRICK-MASTERS OF LONDON AND THE HOME COUNTIES.

A LARGELY-ATTENDED meeting of the brick-masters of the adjacent counties who supply the metropolis with bricks, was held on the 4th inst., at the Hop and Malt Exchange, Borough, S.E. Mr. Alfred Wagge, managing director of the firm of Messrs. Eastwood & Co., Limited, of Belvedere-road, Lambeth, presided. The object of the meeting was to consider the retrospect of the session, so as to arrive at a computation of the loss in manufacture caused by the unparalleled deplorable weather; to discuss the state of labour for the ensuing winter and season's make; and the prospects of trade. Amongst the masters present were Mr. Charles Richardson, Vauxhall; Mr. Looker, Kingston; Mr. Stroud, Southall and Acton; Mr. Minter, Sittingbourne; Mr. L. H. Saunders, St. Helen's, Ryde, I.W.; and Mr. Loat, Clapham.

The Chairman, in opening the proceedings, said the meeting had not been called for any legislative purposes, but for the purpose of comparing the quantity of bricks they had produced during the past unfavourable season. It had long since been computed that 600 millions of bricks was the annual consumption of the London market, but in ordinary seasons with nothing operating unseasonably against the production, the London market consumed about 700 millions; what they wanted to know was what the falling off had been during the past season, which was fast drawing to a close. In large brick-fields there had been a diminution of 25 per cent. He believed the general opinion of the brickmakers was that there would not be so large a profit as heretofore, owing to a variety of causes, the chief cause, of course, being the weather. The consequence was that he believed the diminution of production was on the average more than 25 per cent. below the production of an ordinary season.

Mr. Charles Richardson, of Vauxhall, said he could quite confirm from experience all that the chairman had stated; for last year he had thirty stools, and produced 25,000,000, and this year they had 9,000,000 less. They had 15 per cent. of shelves of "inferiors" more than during any previous season he had yet known. There had been, no doubt, great suffering experienced by the men in consequence of the amount of unworthy earth. If they could compute with tolerable accuracy the amount of bricks which they had made they would be able to arrive at the probable supply which would be required for the season of 1881. He therefore suggested that the masters present should put down on paper their estimated production at the beginning of the season, and their actual production now that it was nearly closed.

This having been done,

The chairman said that the figures showed that the reduction was quite 25 per cent. less than for the corresponding period of last year. The minimum was a decrease of 25 per cent., and in some cases it was 43 per cent. and 44 per cent., and he had no doubt that the diminution might be fixed at 33 per cent. and 34 per cent., and yet he might say that the make of 1878 was nothing like the make of 1877, which fell far short of the make of 1876. He thought that with the price of 32s. during the past season they had made as much money as they would at 40s. during the coming year. He was not one of those who was in favour of forcing up prices. It was only killing the goose that laid the golden eggs, and in their own interest they ought to meet the interests of the builders of London, who were their best friends and customers. Then there was another question, which was, that almost one-third of the earth would be carried over until next year. He would like to hear something said about the question of labour.

Mr. Richardson said the question of wages was one which ought to be considered as soon as possible after a season had finished, because agreements were entered into with the men immediately afterwards. Last March a meeting had been held at the Cannon-street Hotel in regard to the wages question, and at that time it was thought that the reduction in price paid to moulders should take place, but an objection was made that with the agreements entered into with the men nothing could then be done. His opinion was that in the approaching season the employers were entitled to a reduction of 6d. per 1,000 on the moulding, which would amount to 2s. per 1,000 on the actual production. In Kent and other places the wages paid to the moulders regulated the wages paid to the other *employés*. If they did not come to a conclusion on the subject at present they would find it impossible to do so when the season commenced. He thought there was every chance of their having a worse season next year, and that there should be the reduction he suggested.

Mr. Loat (Clapham) quite agreed with Mr. Richardson, that if a reduction was to be made now was the time to do it. Last March, at a meeting held at the Cannon-street Hotel, when seventy or eighty brickmasters were present, it was thought that there should be a reduction; but the great objection to making it was that they had then made their contracts with their men. If the masters made up their minds they could carry the reduction, and he believed the men would accept it.

The Chairman said if the meeting expressed its opinion upon the subject without binding themselves to a resolution it would be satisfactory.

Mr. Stroud said he fancied that the proposal was rather premature, seeing that they were hardly in a position to forecast the future. They had admitted that not more than two-thirds of the bricks usually made in a season had been produced this, and, therefore, how could they reasonably predict that the coming season would be a bad one? He did not quite understand that a reduction of 6d. per thousand to the moulders would represent a reduction all round of 2s. per thousand; indeed, he thought that it would not signify more than a reduction of 1s. per thousand.

Mr. Looker thought that the moulders were paid out of all proportion to the price obtained for bricks. If the weather had been fine during the past season the men would have done very well. He begged to move,—"That this meeting is of opinion that a reduction of not less than 6d. per thousand for moulding should be made."

Mr. Loat seconded the motion. He paid as much as 6s. 3d. and 6s. 9d. per thousand.

Mr. Minter thought the proposal premature. The men during the past season had had a severe time of it. The great difficulty was to get a moulder when you wanted him. If the next season were a good one the moulders would not take 4s. 2d., because they could command 4s. 8d. per thousand.

Mr. Compton said it was quite evident that they were all in the "wash," and not in the "mill," upon the subject. First of all they should have a maximum price for moulding. He had been paying 5s. 8d., but you could not take 6d. off a man who was receiving only 4s. 3d.

On a division the proposal in favour of a reduction was carried by twenty-three to seven votes.

A vote of thanks to the Chairman terminated the business.

A NEW ASSISTANCE: THE SOUTH DEVON HOUSE OF REST.

SIR,—You have always been so energetic a pioneer of any social reform, and so often taken up the cause of excellent charities, that I venture once more to ask your assistance in making more widely known one still in its infancy and sorely in need of aid.

I am the more induced to appeal to you, as you yourself urged very earnestly some years ago in various articles entitled "Another Blow for Life" (after having visited, I am told, at no small personal risk, the lowest and dreariest purlieus of London), the immense need of vast sanitary reforms and the imperative necessity of more light, more air, and purer water for the lower classes,—necessary not only under a point of view of humanity, but also as a check on various epidemics that the want of these inevitably give rise to. You have also suggested ways of relieving the overworked classes. Now it appears to me the most overworked and the most unfortunate class are people not paupers (the burden of maintaining that class is enforced on the community), but individuals to whom the constant fear of sinking into such a condition brings terror and humiliation,—who only ask for strength to continue their work,—who, not having *been* ill, are not eligible for a convalescent home, and, not *being* ill, for a hospital,—who merely want change of air, bodily and mental rest, to regain the strength necessary to take up again the thread of their lives, and to prevent them from breaking down. Under the head of such classes none can appeal more powerfully to every feeling of humanity than overworked women,—such as shopwomen and needlewomen. They are, perhaps, orphans with no country home to go to, or with relatives too poor to help them, or who are, like themselves, toilers in the great city.

However dire a man's need or necessity, there is, in the very fact of his being a man, something that must almost always (except in cases of mental and bodily disease) save him from sinking into the utter and entire helplessness women fall into. The world, as long as he has hands to work with or a heart to accept any fate, is before him. It would not even be degrading to a gentleman who found himself absolutely from force of circumstances without a shilling to work before the mast, break stones on a road, or try his luck at the diggings, and yet once more rise in the scale. But to a woman no such path is open, save only when exceptional genius, exceptional daring, exceptional high pirits, have been given as arms with which to "thrash through the storm" of misfortune. To women not so endowed by nature, and without the influence of any social position, nothing is left but the "daily round and common task," and which becomes in the case of shopwomen and needlewomen somewhat dreary drudgery. The day of misery so pathetically described by Hood in his "Song of the Shirt" is, let us hope, nearly over, though unfortunately the reaction that has set in is not as yet entirely in the right direction, for the wages girls earn at the sewing-machine give them enough to live on, and their evenings free, which induces the less steady amongst them to spend their spare cash on finery and cheap amusements, leaving them without provision for the time when age or illness incapacitates them from work, and throws them back a burden, to be supported by already over-taxed ratepayers. It is not for this class (whom experience alone can teach the folly of their ways) I plead, but for those good and humble women who try to live their lives out conscientiously and laboriously, to whom a breath of fresher air, a stroll in a daisied field, would be as the very foretaste of heaven, invigorating the tired

frame, sending them back to their daily routine with fresh courage and energy, and with the prospect in the future of another outing.

To provide this, and supply a link in the chain of charities, an establishment called the "South Devon House of Rest" has been founded at Babbacombe. A house has been secured in a high and healthy situation near breezy downs above the sea, and amidst beautiful scenery; the rent has already been provided for by a lady; the size of the house enables sixty young women to be received, and as the means increase its accommodation will be extended. An annual subscription of 1*l.* 1*s.* admits an inmate for three weeks, the inmate to pay, in addition, 5*s.* per week. It is under a committee of management including the Rev. John Hewett, Vicar of All Saints, Babbacombe, and Rural Dean; the Duchess of Sutherland, Stafford House; Miss Roberts, Florence Villa, Torquay; and Miss Skinner, Bayfield, Babbacombe.

To many of their own sex, to whom the good things of this world come without an effort on their part, and who calmly float through life almost as unaware of what the dread phantom of utter poverty,—through enforced cessation from work, looming before the eyes of over-worked women,—means; of the gnawing pangs of hunger, the nipping cold of the fireless hearth, the terror when the landlord calls for the few shillings necessary to keep some modest tenement over their heads,—as the hapless queen who suggested cakes when there was no bread, an appeal can scarcely be in vain. Could they but realise the feelings that must fill the hearts of these poor women when they see the possibility of a few weeks' repose, they would, I am sure, give some yearly sum, if small as the widow's mite, but which, in the aggregate, would, ere another autumn, establish this charity on as firm a basis as the orphanage of the good Abbé Roussell at Auteuil, which, owing to the unaided but powerful pen of M. de St. Genest, became in a few weeks one of the noblest charities of Paris.

The prayer of Ajax was for light; these poor workers pray for "rest," and if this appeal finds the echo it merits in the heart of some more happily placed, I cannot but think that the knowledge that through their means some faint portion of the enjoyment they derive from change of air and scene has permeated down to their humbler sisters will add a keener zest to the intellectual treat of a trip on the Continent, the lazy delight of a float on the Mediterranean, or the invigorating tramp through the scented heather of a Scottish moor. C.

LONDON WATER-RATES.

MR. CHARLES L. GRUNEISEN, writing from Surrey-street, Strand, says:—

"The public at large has, indeed, every reason to be grateful to the Society of Arts for its continued efforts to secure a more plentiful supply of water, and at a more reasonable rate than the one imposed at present by the New River Company. I do not see that any special merit is due for any alleged improvement, either in the quality or the quantity. The consumers and water-rate payers had a right to expect every consideration. It was to the interest of the companies to be liberal with their customers. As I think my experience is indicative of the peculiar system of rates imposed by the water companies, I submit the facts for your information. When I returned to London, after a residence abroad for some years, I purchased the 1843 lease of the house I occupy. The ground-rent, for the Duke of Norfolk, was 50*l.* per annum, I, of course, being bound by the covenants for repairs, besides having to pay a large sum before taking possession. The parochial rates were calculated at 43*l.* per annum. My water-rate for years was 30*s.* per annum. Now the parochial rating has been raised from 43*l.* to 63*l.* per annum, and as this is the basis on which the water-rate is charged, I now pay 4*l.* 0*s.* 6*d.* per annum. The other local rates are, of course, proportionately increased.

Now, we are only two in family, and the consumption of water is now much less than in former years, for the simple reason that we do not have visitors staying with us as at a previous period. The value of the house is not one farthing more to me than it was when I took the lease. As a man of letters, and as a journalist, I occupy and use my premises. There is no prospective value, even if I now tried to sell the lease for the ten years it has to run. I took the house on economical grounds, and I have been quite defeated in my calculation as to the amount I could yearly afford for house-rent, local taxes, &c.

Thus, without having the smallest increase of accommodation, without having any additional supply of water (less, in point of fact, at the present time), without deriving any advantage whatever of increase for estimated value of the house, every year I find the local outlay larger and larger. A beneficial lease might justify the additional charges, but my contention is that such is not my case, for the liability for repairs renders the landlord's ground-rent quite high enough in a street now filled with hotels and boarding-houses, instead of being inhabited, as in the first place, by private persons."

SKETCHES IN ALGIERS.

MR. F. A. INDERWICK, Q.C., is contributing to the paper of his locality, the *Rye Times*, an account of a Vacation Tour in and about Algiers. As concerns the *town*, Mr. Inderwick says:—

"The town itself has two distinct characters, the upper portion being that formerly and still occupied by the Moors; and the lower, having been built by the French from time to time, after their monotonous style of architecture, with boulevard and squares, is occupied entirely by them. As to this portion of the town, notwithstanding the eulogiums commonly passed upon it, it is, with the exception of the quay, not of a character to shed a glory even upon a second-rate French watering-place. But the upper town still retains, in a great degree, its ancient characteristics. The streets, narrow, about 6 ft. in the widest, steep and dirty, swarm with Arabs and Jews. The closely-veiled women, with their black attendants, go and return from their baths and their shopping; and the men lounge or sleep in their coffee-shops and on the sides of the streets, or, with the eternal cigarette between their lips, lie on their matting, or sit on their carpets gossiping over their coffee. This coffee, known as '*Café Maure*,' as distinguished from the French coffee, and as sold at these shops, is prepared by the Arabs in a peculiar mode, and one which is strongly to be recommended to all persons wishing a really good and well-flavoured cup of coffee."

"Many of the old Moorish houses, now occupied by the French, are, in the interior, of very beautiful Oriental construction and design. Probably the most unique and the most perfect in its way is the Palais Episcopal, now the residence of the bishop, but formerly a palace of the Dey of Algiers. It is built in the true Moorish style, with a large marble courtyard, with fountains in the centre, surrounded by galleries with tesselated tiles, supported by pillars of Algerian marble. From out of these galleries open the reception-rooms and the sleeping apartments. One of the rooms is fitted up as the private chapel of his Eminence, and is decorated with a painting of the Descent from the Cross, by the Duchesse de Malakhoff. The palaces of the Governor-General and the Court of Justice are in the same style, the courtyard in the latter case having been converted into the Court, and the galleries being reserved for the use of the spectators.

Many houses still in fine preservation, and gorgeously fitted up in the Eastern style, are now occupied by the wealthier Moors and Jews. They are, however, for the most part inaccessible to strangers, being occupied by the wives and families of the owners. They are all lighted from the inner courtyard, which is open to the sky, and have no windows except a few loopholes, which have been punctured in the outer walls mainly for the purpose of ventilation. They are all flat-roofed, and on these roofs, in the cool of the evening, the inmates are accustomed to sit, particularly those of the lower orders, whose women are often to be seen sitting on the house-tops, with a scarcity of drapery which would in a European country invoke the interposition of the municipal police. And in the more crowded and poorer parts of the town the communication between the houses is said to be carried on by means of the roofs, without the necessity of a descent to the street."

Then a word or two as to the mosques:—"The great architectural features of Algiers are, undoubtedly, the two large mosques, situated in the lower portion of the town, and seen clearly from the sea. The large mosque, that of Djama Kebir, is of some antiquity. It is surrounded by a colonnade, with pillars of Algerian marble, which, with the continual running of water from its fountains, makes it a cool and inviting lounge for the lazy Arabs. The interior of the mosque is entirely white-washed. It consists of several courts, amongst which is one with a few trees and a large fountain, where the Mahometan performs his ablutions before attending to his prayers; for, according to the Mahommedan religion, cleanliness is not only next to godliness, but it goes before it, as their devotions count for nothing unless preceded by ablution. The floor is covered with matting and carpet, and no one, according to Mahommedan custom, is allowed to enter within the sacred precincts with his shoes on his feet. The coolness of the air within these buildings, and the relief afforded to the eyes by the subdued light, together with the perfect stillness of all around, make them a favourite resort among all classes of the Arabs, who come there, not only to perform their devotions, but also to while away the time which they have either no means or inclination to dispose of more profitably. Within the curtilage of the mosque, and adjoining the fountain court, is a native tribunal, composed of a kadi and two muftis, who administer the law according to the Koran. Their powers, however, are only civil, and are confined to the settlement of disputes arising between natives. A criminal case or a civil case in which a native and a European are litigants must be taken before the French courts."

To the male stranger the interior of a Moorish residence is inaccessible, but the same obstacle is not always thrown in the way of a lady, to whom, upon a proper introduction to the patriarch of the house, and on an intimation of her wish to become acquainted with the ladies of his family, an invitation to visit the harem is not unfrequently accorded. This opportunity was afforded to Mrs. Inderwick, who contributes to the first instalment of The Tour a brightly-written account of her visit to the female members of one of the richest families in Algiers.

COMPETITIONS.

Greenock Municipal Buildings.—On the 2nd inst., Mr. Scott, measurer, Glasgow, submitted to the Town Council, the following estimate of the cost of the six selected designs:—"Art and Science," 78,679*l.*; "Omega," 51,241*l.*; "Let Greenock flourish," 57,845*l.*; "Qui dit Progrès dit Labeur," 62,480*l.*; "Ciconia," 67,624*l.*; "M. B.," 55,049*l.* These amounts are lower, it may be seen, than the estimates of the referee. On Monday last the Town Council and Police Board met privately and discussed the merits of the six designs for the new corporation buildings. A decided and general preference is stated to have been indicated in favour of the plans sent in by Messrs. Barclay, architects, Glasgow. This selection, says the *Scotsman*, although not final, may be said to have been virtually made.

Over Darwen Town-hall and Market-house.—Mr. Waterhouse, to whom these designs were referred, recommended for first premium, Mr. Chas. Bell, Union-court, Old Broad-street; for second, Messrs. E. Salomons & R. S. Wornum; and for the third, Mr. R. K. Freeman. At the last meeting of the Council this award was adopted, and it was resolved, on the motion of the Mayor, that the first premium, 100*l.*, for the Town-hall, and 75*l.*, for the Market-house, be paid to Mr. Bell, by whom the work, in due course, is to be carried out.

Southport Convalescent Home.—It is proposed by the governors of the Cotton Districts Convalescent Fund to expend from 25,000*l.* to 30,000*l.* from the fund at their disposal in the erection of a convalescent hospital and sea-bathing establishment, in conjunction with the one already in existence in Adelaide-street, Southport. The building is to accommodate about 200 male convalescent patients, the present hospital to be used for females only. The governors recently advertised for plans for the proposed additional hospital, offering two premiums of 100*l.* and 50*l.* respectively for the two best designs which should in their opinion comply with their requirements, viz., convenience and compactness of arrangement, simplicity but tastefulness of design, and economy. In response to the advertisement, nineteen designs have been sent in to the governors, and they are now on view at Haworth's Buildings, Cross-street, Manchester. No limitation as to expense was named, and the estimated cost of the schemes submitted is stated to vary from 6,000*l.* to 30,000*l.*

A DANGEROUS DECISION AS TO DANGEROUS STRUCTURES.

THE following official report with reference to a decision given on the 3rd inst. by Mr. Mansfield, the magistrate at Marlborough-street, has been sent to the Superintending Architect of the Metropolitan Board of Works. The matter seems very serious:—

"21, King William-street, West Strand, W.C.,
September, 1879.

Re Dangerous Structure, 29, Haymarket.

Dear Sir,—I beg to call your attention to the decision given by Mr. Mansfield at Marlborough-street Police-court on Wednesday last with reference to a dangerous structure in the rear of 29, Haymarket.

The house 28, Haymarket, has been lately taken down for the purpose of being rebuilt, and the premises No. 1, Arundel-place, adjoining it in the rear, which also abut on the back of 29, Haymarket, having been found in an extremely dangerous condition, an order was made some weeks ago by Mr. Mansfield for the removal of the inmates and for a considerable portion of the building to be taken down, and also for the removal of the side wall adjoining, belonging to No. 28, Haymarket.

While this order was being complied with, it was discovered that there was a vault on the ground-floor of No. 1, Arundel-place, which belonged to Mr. Fagg, the owner of No. 29, Haymarket (the properties being intermixed). This vault is about 6 ft. wide by 9 ft. long, and is arched over by a brick arch, which is only 4½ in. thick, and covered with rotten brick rubbish, whilst the side of the arch springs at its abutment from a defective wall only half a brick thick.

My attention was called to this by an order from the Board to report as to its safety on August 13, and on inspection I found it so dangerous that it was impossible for Messrs. Kirk & Randall, the contractors who are executing the work adjoining, to comply with the magistrate's order *already made* to take down the dangerous structure *above it on the one side* and *beneath it on the other*. In fact, so imminently dangerous did I consider it that I advised the owner, without a moment's delay, to employ Messrs. Kirk & Randall (as they had materials on the spot) to put up two temporary struts on the other side with cross pieces, at once, to support the arch in order to prevent a catastrophe, and this suggestion he at once adopted.

Nothing has since been done, and the case was heard by Mr. Mansfield on Wednesday last, when counsel and witnesses on behalf of Mr. Fagg, the owner, though they *admitted the structure was not strong enough to stand by itself*, yet attempted to prove that because it *had been shored* it was safe, and though I gave evidence (which was corroborated both by the foreman and architect to the works adjoining) that the wall and arch were *liable to fall at any minute*, notwithstanding the shores, yet the magistrate, in giving his decision, said that while he considered it was a very dangerous practice ever to have erected such a structure, yet, as the witnesses on the other side had stated it was shored, he considered it was safe and should *dismiss* the summons.

The Board's solicitor, Mr. Napier, tried to get me recalled to give evidence as to the insufficiency of the shores, but the magistrate declined to hear me, and upon my pressing him to view the structure before deciding the case, he refused to do so, and said *he himself would take the responsibility*.

The decision of Mr. Mansfield, I submit, is wrong in law and against the facts.

Sections 72 & 73 of the Building Act specify that when a district surveyor has reported a structure to be dangerous, the Board shall shore up to protect the public, and if the owner then fails to comply with the requisition served on him as speedily as the nature of the case permits, he shall be prosecuted by the Board before a magistrate, who shall make an order for the necessary works to be done.

If the Board are entitled to prosecute after shoring up, Mr. Mansfield's decision is *evidently wrong*. Simply shoring a building cannot make it legally safe, and in the clause giving the magistrate power to order the necessary works to be done, shoring is not even mentioned; and it is obvious that such works must be done *in accordance with the other clauses of the Building Act*, which distinctly *prohibit* buildings from being *secured by timber*. But if the magistrate's decision is right *every building* which is *shored up is safe*.

I consider this case so important that I must ask you to bring it officially before the Metropolitan Board of Works, and I enclose photographs and drawings which will explain it.

I may add that the contractors have taken their men away from this part of the works, and, in my opinion, it would be an *act of madness* on their part to attempt to remove any more of the upper and lower structures already condemned by the magistrate till this rotten and fragile *intermediate erection* is removed. In fact, I fully anticipate that an accident, with consequent loss of life, will occur, unless some prompt steps are taken. The contractors also inform me that they have given the magistrate notice they will not be answerable for the result of his decision, both as regards *life and property*.

Upon examining the struts on Friday last, I found they were so unsafe that they could be shaken by the hand, and I have, therefore, now given a fresh certificate to remove the insecure and dangerous shores, and all works supported by them.

I need scarcely point out the hardship and injustice inflicted on myself by the *summons being dismissed*. I not only have to *pay costs* in the matter, but am practically *censured for doing my duty*, simply because, as an act of courtesy, I directed Messrs. Kirk & Randall's foreman to place some struts against an adjoining house to prevent an accident and loss of life, whilst those gentlemen for carrying out my instructions have their works stopped and their workmen's *lives endangered*.

District Surveyors, by Mr. Mansfield's decision, will be put in an awkward dilemma. If they find a building falling and promptly get it shored up, they are then told it is safe, and are cast in costs; and if they let it alone pending the law's delays, and some one is killed, there is all the annoyance and worry of a coroner's inquest.

The Haymarket accident, which happened three doors from the spot in question, a few months ago, was to a great extent the result of the uncertain way in which the law is administered in these cases, and as a public officer called upon to give evidence to enforce the building laws for the protection of human life, I cannot let this question rest in its present unsatisfactory state.

I may mention that Mr. Vaughan, Sir James Ingham and other magistrates have never refused my request to inspect structures such as these before giving their decision.

I am, &c.,
ROBERT WALKER, F.R.I.B.A.,
District Surveyor of St. Martin-in-the-Fields.

To the Superintending Architect,
Metropolitan Board of Works.

I have sent a copy of this letter and the photographs both to the Home Secretary and Mr. Mansfield."

"APPOINTMENTS BY LOCAL BOARDS."

SIR,—Will you permit me to reply to Mr. Hodgson's letter, in your issue of the 30th ult., to draw attention to a point he seems to have overlooked? In the present depressed state of trade there are many well-qualified professional men who are willing to accept comparatively small salaries, so that in the majority of cases the Local Boards have amongst the candidates several good men to choose from; but their choice often falls upon some one who has little to recommend him beyond his being a local candidate. I think the case of the appointment of Surveyor to the Dartford Highway Board is a fair illustration. The salary was 200*l.* per annum, and there were originally, I believe, sixty-two candidates. These were reduced to twenty-eight, and subsequently to seven, from which number a local candidate was selected, who openly stated that his principal qualification was having been a master in an industrial school, and that he had been ordered by one of the waywardens to apply for the appointment.

FAIR PLAY.

SURVEYOR TO THE DARTFORD HIGHWAY BOARD.

SIR,—This little practical joke is over. The situation was advertised at great length in your columns, salary 200*l.*, 256 miles of roads, surveyor to keep a horse, &c. Candidates to be in attendance at the Dartford Workhouse *at their own expense*. The day saw a gallant band of thirty of us assembled. There were sixty-two applicants, but the balance failed to attend.

One of us was a late articled pupil of Sir J. Bazalgette, another had been assistant in the office of the surveyor of one of our largest Midland towns, two were chief assistants in leading London parish offices, several were surveyors of towns, large or small, and one came from *Scotland*. What was the result? The Board elected a gentleman who is acting as surveyor to an adjoining district; all we heard about his qualifications was that he had unfortunately lost one arm, and that he and his wife were formerly superintendent and matron of an industrial school!

Now, sir, is it not cruelty to allow educated gentlemen to incur heavy expenses in attending such a meeting?

If the Board had selected, say six of us, and paid our expenses, we should not have grumbled. But now!

A CANDIDATE.

NOTES FROM DUBLIN.

Main Drainage.—At a meeting of the Corporation on the 4th inst., a letter was read from the Right Hon. James Lowther, Chief Secretary of State for Ireland, stating that he was directed by the Lord Lieutenant to acquaint the Town Council that the Lord Lieutenant proposes to appoint a Royal Commission to inquire and report into the sewerage and drainage systems of the city of Dublin, and their effect on the sanitary condition thereof, and that his Grace proposed to entrust the inquiry to Mr. Robert Rawlinson, C.B., C.E., Chief Engineering Inspector of the Local Government Board in England, and Mr. Frederick Xavier M'Cabe, Inspector of the Local Government Board in Ireland. The matter has lately been under the consideration of the Corporation, but its further discussion has been stopped by the foregoing announcement. The Corporation, has, however, nominated a committee to take charge of the matter on its behalf, to prepare all necessary information to lay before the Commission, but with instructions not to advocate any particular plan. It may be interesting to note that Mr. Richard Hassard, C.E., in a letter addressed, on the 30th ult., to the town clerk, says,—

"I have often stated, and I now repeat, that an excellent work of main drainage for the city and remaining townships (Rathmines and Pembroke being already provided for), by which the river would be effectually freed from pollution, can be carried out for 300,000*l.*, and I am willing that my plans, estimates, and mode of dealing with the question should be submitted to Sir John Hawkshaw, on the understanding, if adopted, I am to be engineer to my own project, or that, if the authorities elect to carry out the works by their own officers, I am to receive such professional honorarium as may be agreed on or awarded in the case of difference arising."

Foley's Sculptures.—At a meeting of the Municipal Council held on the 1st inst., the Town Clerk read a letter from the Science and Art Department, London, stating that they are unable, with the means at their disposal, to repair and send to the Science and Art Museum in Dublin all the casts bequeathed by the late Mr. Foley, R.A., or to provide space for them; that a committee of sculptors has been appointed to make a selection of such as could be put in a state for exhibition for 500*l.*, and the Lords Commissioners of Her Majesty's Treasury desired to know if the Corporation of Dublin would have any of the statues on the same terms as they

OPEN CONTRACTS.

	On or before	Tenders to be delivered to
Over School Board: additions and alterations.	Monday, Sept. 15.	John H. Cooke, clerk.
Great Western Railway: 8,000 loads of Quebec yellow pine.	Do.	Fred. G. Saunders, secretary, Paddington Station.
Chiswick Improvement Commissioners: alterations and additions to vestry-hall.	Do.	Robert F. Finnis, clerk to the Commissioners.
Borough of Brighton: erection of about 900 cubic yards of walling round waterworks.	Do.	James A. Freeman, town clerk.
Knutsford, Cheshire: rebuilding of Holy Cross Church.	Tuesday, Sept. 16.	Paley & Austin, architects, Lancaster.
Sheerness Local Board: supplying and fixing a multitubular boiler and feed heater.	Wednesday, Sept. 17.	N. H. Stallion, clerk.
Burial Board, Worcester: erection of stone walls and iron fencing.	Thursday, Sept. 18.	Thomas Southall, town clerk.
Feversham Gas Light and Coke Company (Lim.): erection of new wharf and works.	Saturday, Sept. 20.	Henry Bathurst, secretary.
London, Brighton, and South Coast Railway: erection of station-master's residence, booking offices, goods shed, warehouses, &c.	Tuesday, Sept. 23.	Secretary, London Bridge Terminus.
Borough of Ipswich: purchase, pulling down, and removal of the material of the structure of the Ipswich Corn Exchange.	Wednesday, Sept. 24.	John Orford, town clerk, Ipswich.
Borough of Ipswich: erection of Post-office.	Do.	Do.
Taunton, Somerset: erection of church.	Do.	J. Houghton Spencer, clerk.
Local Board of Malvern: construction of sewers.	Saturday, Sept. 27.	J. H. Whatley, clerk.
Urban Sanitary Authority, Belgrave, near Leicester: construction of 6½ miles of sewers, and two horizontal condensing engines.	Monday, Sept. 29.	Jos. Barber Haxly, clerk.
Church Gresley Burial Board: erection of lodge and board-room.	Do.	William Willshee, Ashby de la Zouch.
Corporation of Cork: construction of wrought-iron swing bridge.	Tuesday, Sept. 30.	A. McCarthy, town clerk.
Staines Local Board: new town-hall.	Tuesday, Oct. 28.	John Anthony Egell, clerk.

would be offered to schools of art, viz., that they shall defray the cost of packing and removing them. Mr. Gray moved:—

"That the letter be acknowledged, saying that the matter is under consideration; that it be referred to the General Purpose Committee for report, the law agent to ascertain if the Corporation can legally spend any money for the proposed purposes, and write to the Science and Art Department to ascertain whether, if the Corporation brought the models over, or any of them, the department would take possession of them."

It would, he said, be a very lamentable thing if these models were lost, but if the Corporation were to bring them over they would have to decide where they could put them, and he knew of no place. They would have to get information before they could make up their minds. He thought under the circumstances that the Government might have given a larger amount than 500*l.*, but it was mentioned in the House by him, and they seemed to think they were doing a very generous thing in giving any money at all. The resolution was passed.

The Artisans' Dwellings Act.—At the same meeting, Mr. E. D. Gray moved,—

"That in view of the facilities given by the Artisans and Labourers' Dwellings Act, 1875, Amendment Act, 1879, this Council is of opinion that these Acts might be put into more extensive operation in Dublin, and recommends the subject to the immediate attention of the Artisans' Dwellings Committee, which is hereby authorised to prepare a scheme or schemes, with estimates, and take all necessary steps for that purpose, but nothing further to be done without further sanction of the Council."

The speaker said he had been the first to propose that the Council should adopt the Act, but seeing that the matter was beset with difficulties, he had suggested merely a tentative scheme. In working it out they abandoned half in consequence of the heavy expenses. Experience in other towns showed the same thing, that they could not obtain their value for the sites when cleared. Sometimes in London they did not get more than one-fourth or one-fifth of the cost of clearing the sites, and useful as they recognised the Act to be, they also recognised that in view of the great expense it was almost impossible to carry it out. An amendment Act had just been passed which very materially changed the condition of affairs. Under the original Act they purchased the interests of the parties owning the properties at their full market value. They all knew that, after all the arbitration, that meant about twice its actual value. Now, by Clause 3 in the Amendment Act it was provided that where any house in an unhealthy area was found, in consequence of overcrowding or any other cause, to be a nuisance, they should estimate the cost of removing the nuisance and making the house habitable; that they should estimate the value of it when such improvements were effected, and deduct the cost from the sum payable to the owner as the full market value. In some cases it would very materially reduce the compensation to be paid, and it would make the Act workable. Alderman Gregg said he thought it would be better to take advantage of the Amendment Act to go on with the old scheme in Boyne-street, instead of taking up new schemes. He would suggest an amendment of the resolution, omitting the words "this Council is of opinion that these Acts might be put into more extensive operation in Dublin, and." Mr. Gray agreed to Alderman Gregg's amendment.

A Public Abattoir.—On the motion of Mr. Gray, seconded by Dr. Moyers, it was resolved, "That the Council recommend to the Public Health Committee the propriety of taking steps to provide a public abattoir for Dublin, and authorise it to prepare a scheme and estimate for that purpose; but no further steps to be taken without the authority of the Council."

EPPING FOREST AND FOREST TREES.

SIR,—Permit me to correct a word occurring in my communication of last week, which, as printed, makes me say the opposite of that which I intended. Referring to the new hotel I wrote:—"As to its design and completion you probably would, I think, join with me in *commending* most of it," which word here in italics is printed "condemning."

This correction, however, does not qualify the opinion I expressed as to the incongruity of placing the hotel where it is. URBAN.

GAS JOTTINGS.

Ilkeston.—The Local Board has decided to enlarge the gasworks at an outlay of 7,500*l.*

Greenock.—What is stated to be the first exhibition of gas apparatus in Scotland was opened on Tuesday, the 9th inst., in the Watt Institution, Greenock.

MONUMENTAL.

Daniel O'Connell.—At a meeting of the O'Connell Monument Committee, held in Dublin, on the 4th inst., Mr. E. Dwyer Gray, M.P., the hon. sec., read the following certificate from Mr. H. H. Armstead, dated July 5 last:—

"I have this morning seen the model in plaster of the circular relief of the above, and found that Mr. Brock had very carefully carried out the late Mr. Foley's design. The figures of the bishop, peer, commoner, and workman are very good. Indeed, the entire work is excellent, and I have much pleasure in certifying that the amount named in the contract, viz.:—800*l.*—as due on the completion of the model of the circular relief, may now be paid to Mr. Brock."

The payment was ordered to be made. It was resolved that the stone for the monument should be the best Irish limestone, and that steps be taken to put the work in hand. It appears, however, that the site is not yet determined upon. It has been suggested by Messrs. Lanyon & Lynn, and by others, that the centre of the new Carlisle Bridge would be the most appropriate position, but Mr. Doherty, the contractor for the bridge, has stated that it would not, for structural reasons, be feasible to erect the monument in that position.

Thomas Clarkson.—Nearly a hundred years ago, viz., in June, 1785, Thomas Clarkson, the great advocate of the abolition of slavery, resting by the side of the highway near Wadesmill, on the road between Ware and Royston, resolved to devote his life to the abolition of the slave trade. And being in the neighbourhood about forty-five years back, in company with the Rev. Dr. Merivale, Dean of Ely, Clarkson pointed out the spot to him; and last autumn the Dean identified the precise place in the presence of Mr. Arthur Giles Puller, of Youngsbury, who proposes (according to the *Herts Guardian*) to place there an obelisk in memory of so interesting a circumstance.

John Knox.—The committee who are promoting a monument to John Knox have visited the studio of Mr. D. W. Stevenson, A.R.S.A., in Edinburgh, where they inspected a model design, which they approved, and commissioned Mr. Stevenson to execute the work if funds admit. Figures of Patrick Hamilton, George Wishart, George Buchanan, and Andrew Melville are to be placed at the four corners of the pedestal. The place selected for the monument is in the square to the west of St. Giles's Church, facing the High-street. It is estimated that the cost of the monument will not exceed 2,000*l.*, and over 500*l.* have already been subscribed.

VARIORUM.

THE maps and illustrations for the Handbook to the Bible, which we announced, in April last, as in course of preparation for publication, are now engraved. We shall hope to have the opportunity of referring in detail to the subject on the publication of the work; but our readers cannot fail to take interest in a brief notice of the illustrations. Among these is a plate of the various alphabets used in the Holy Land, showing the gradual changes that have occurred in the forms of the Aramaic letters during a period of 800 years, together with the Samaritan alphabet, and that of the Ashuri, or "sacred writing," usually called square Hebrew. There are four plates of Jewish coins, tracing the series from an archaic specimen bearing the name of "Eliashib the Priest," down to Pontius Pilate and Agrippa II. One plate of this series represents all the coins distinctly referred to in either the Old or the New Testament, such as the gold "dram" of Nehemiah; the "shekel of the sanctuary"; the stater found in the mouth of the fish, or "Peter's penny"; the "penny" of the Good Samaritan, or *denarius* of the tribute money bearing the "image and superscription" of Tiberius Cæsar; the larger farthing, or assarion, for which two sparrows were sold; the "uttermost farthing," or kontrinek, which was a fourth of the above; and the "widow's mite," the half of the last-named coin. Among the maps will be found a carefully-shaded map of the Holy Land, accompanied by coloured charts, showing the state of the country before the invasion by Joshua, the route of Joshua through Southern Palestine, the tribal boundaries, and the kingdom of Herod the Great. These are followed by a plan of ancient Jerusalem, in which the actual rock contours of the site, at heights of 50 ft. apart, are delineated, the hills are shaded, and all extant monuments are shown. This part of the work is printed in black. A diagram in red shows the outline of the ancient walls, as far as their course is plainly indicated by the exigencies of the site, or by existing scarps and ruins. There is an enlarged plan of the Temple Hill treated in the same way; the contour lines being 10 ft. apart, and the courts and buildings of the Temple, according to the dimensions given by the tract Middoth of the Talmud, by Maimonides, and Abarbenel, being drawn in red. It is thus possible for the student of the plan to distinguish at a glance what are the ascertained physical facts of the site, and what are the coincidences between those facts, and the dimensions recorded by the ancient writers on the subject. The whole of this inquiry is treated in the work itself; but the illustrations contain the sum of what has been discovered to the latest date, independently of any theory or conjecture.——Mrs. Brassey commences "My Journal in the Holy Land" in the current number of *Fraser*. It is brightly written, and very pleasant reading. ——Who has not at one time or another viewed with dismay the "back premises" of his lodging at the seaside? The *Lancet*, writing on the subject, says truly:—"Whenever, if ever, it happens that the owners of property which is chiefly used by 'visitors' at a particular season come to recognise the economic prudence of placing it in a perfectly sanitary condition, attention will perhaps be directed to 'back premises' at the seaside. The general state of these hidden localities is, as a rule, most deplorable. They are blocked with lumber, employed as receptacles for refuse, or left in a condition discreditable and dangerous to health. Nothing but the most perverse neglect of opportunities can explain this fact. In nine out of ten instances sanitary prudence would suggest building out of special offices, and draining away at the back, so as to leave the residence free from those emanations of sewer-gas which make most 'lodging-houses' disagreeable, and, to a sensitive person, barely habitable. It is also very commonly the fact that in the rear of a stuffy house there is space for the laying out and cultivation of a small garden, which would greatly enhance the value of the property. Considering that most of the well-to-do residents in cities pass some one or two months or more of the year in 'seaside' lodgings or hotels, it is not unreasonable to ask that something may be done to improve the conditions of life to which they are condemned."——In the current number of *Social Notes*, Dr. Alfred Hill, medical officer of health, speaks thus as to Birmingham:—"A remarkably glaring instance of the total disregard of sanitary considerations came under my notice only a few months ago in a terrace of houses well built, with small plots of garden in front of each, and occupied by very respectable persons of the artisan class. The ashpit, which was very large, open to the heavens, and necessarily wet, was so situated in the centre of a back-to-back row of the buildings as necessarily to cause soakage into the walls and foundation of all the surrounding houses, and the privies were enclosed in the block of buildings, forming an integral part of it, and situated under bedrooms. The soft and hard water pumps adjoining were both seriously contaminated, so that the tenants were both breathing and drinking the products of putrefying animal matters of the most dangerous description, with the result, which you will hardly be surprised to hear, that nearly every house had sickness in it, about fifteen or sixteen cases in the terrace, one house alone having as many as six children suffering from fever. As if to leave no chance of escape, the scullery sink in every house was in direct communication with the drain. Common privies ought to be abolished in favour of either a good interception method or of water-closets. I think I have succeeded in showing how imperfect is the system of drainage in Birmingham, and there is reason to believe our town is no exception to the rule, and how desirable it is that the authorities should be moved to provide for the proper laying and construction of drains. My experience only confirms that of others, that an imperfect drainage system lies at the root of the greater part of preventible disease. Every day I observe that the particular house in a row or a court in which disease exists is that one nearest to a sanitary structural defect; for instance, the house nearest the untrapped drain, or nearest the ashpit, and particularly where the latter adjoins the house."——Messrs. Cassell & Co. have commenced the publication of a new fine-art edition of Longfellow's Poems. "The five hundred illustrations with which it will be

enriched, will consist of landscapes, figure subjects, and ornamental designs, expressly prepared for this edition. The landscape views have been drawn from nature, and have been entrusted to the best artists of America, whose efforts will be supplemented by designs from eminent English and Continental artists. Among these may be mentioned P. H. Calderon, R.A., Frank Dicksee, Giacomelli, and others." The first number now before us is a very good beginning.——The same publishers have commenced the re-issue, in cheap parts, of David Roberts's "Holy Land."

Miscellanea.

Ninth Century MSS.—Mr. S. J. Capper describing in the *Times* the Abbey of St. Gaul, at the Bodensee, writes thus:—"The Abbey buildings have been frequently destroyed by fire, and rebuilt, and are of little architectural interest. The spacious church is in the rich and gaudy, but debased, style of the last century. Happily, alike through the ravages of the Huns and the troubles and wars of the Middle Ages, and when iconoclastic reformers stormed the Abbey and French *sans-culottes* exemplified the doctrines of universal brotherhood by unsparing plunder, the good monks knew how to hide and protect their literary treasures, so that out of a catalogue of manuscripts that was compiled in 823 A.D., no less than 400 are still extant. Among these is a copy of 'Virgil' believed to be the oldest in existence. It is written in fine Roman capitals, without division into words or punctuation, and is supposed to date from the third century. More interesting even than this is the vocabulary supposed to have been written and that was certainly made use of by the holy Gallus. It is pocket size, and was intended to teach him the language of those to whom he came. From it we learn that the ante-Carlovingian German was very like the Suabian and Swiss dialects still spoken. From the Latin and German words in parallel columns I take the following:—'Columna'—'Sili,' which is exactly what the modern Swiss would say for the high German word 'Säule,' a pillar; 'Folium' is 'Plat,' high German 'Blatt,' a leaf; 'Foliæ,' 'Laup,' 'Laub,' foliage. There are also several copies of the Gospels executed in Ireland in the sixth and seventh centuries, and a most interesting translation of the Bible into German of the eleventh century interlined with the Latin. When the old monk is doubtful about the German equivalent he writes the Latin into the texts and puts the German in small letters above,—thus $\binom{\text{Gottes Kind}}{\text{Filius Dei}}$. Very hard must the old monks have toiled copying out and gorgeously illuminating all these works. In the margins we find expressions of thankfulness that evening had at last come to end their labours, appeals to their patron saints to give them patience, or a desire for a bowl of wine or can of beer to sweeten the sour task; for monks were human and could be drouthy. Let us be grateful to them for all their labours have preserved for us."

The Proof-Butts, Woolwich Marshes.—Extensive works are in progress at the proof-butts in the Government marshes adjoining the Royal Arsenal, Woolwich, under the direction of Colonel W. H. Noble, Royal Engineers, Inspector of Works. A new firing platform, with recoil railway, for the proof of heavy guns, is being laid down on a firm foundation of concrete, and a new bay is being added to the proof-butts in front of this platform to receive the projectiles fired from the guns proved on it. A bursting chamber is being built adjacent of strong materials in very solid form, as requisite for the purpose to which it will be put,—the testing of guns to destruction in order to determine their relative durability.

The Quay at Galatz.—The loss caused by the sinking of the quay wall at Galatz is estimated at 750,000f., without taking into account the damage to commercial affairs. The masonry lies between six and seven mètres below the surface of the water. A considerable further length of wall is likely to follow. When quay walls, bridges, or other similar works are erected and remain without accident, nothing is thought about them or their designers and constructors. It is only when they fail that people are led to think of the knowledge, skill, and care that are required to ensure success.

East and West End Properties.—One of the large rooms at the Auction Mart was crowded on the occasion of the sale by Messrs. Edwin Fox & Bousfield, of seventeen lots of small freehold house-property and vacant land in Bethnal-green and Mile-end, under directions from the Court of Chancery. The principal lot was described as being about one acre and a quarter of undeveloped land in the rear of Cambridge-road; the first bid was 4,000*l.*, which increased by fifties up to 4,600*l.*, at which sum it was sold. There were two other small plots of land at either end of the above, which fetched 810*l.* and 200*l.*, the latter being about three per cent. on the rental, and the former over forty years' purchase. A ground-rent of 6*l.* 10*s.* per acre, with reversion in 1881, realised 700*l.* The other lots were all weekly tenements in and about Cleveland-street, Union-place, &c., producing gross rents of 638*l.* per annum, from which rates, taxes, and other expenses have to be deducted: they brought together 7,175*l.*, or a little over eleven years' purchase. The total of the sale was 13,485*l.* Houses at the West End did not fare equally well; four in Clanricarde-gardens, Hyde Park, each let at 180*l.* per annum, failed to realise the reserve prices, and were bought in.——Messrs. Bray, Webb, & Harwood offered for sale by auction, the corner house, with shop, known as No. 76, Crawford-street, Portman-square, Marylebone, let at 55*l.* a year, and held for a term of twenty-six years, at 7*l.* 7*s.* per annum ground-rent. The property was sold for 550*l.* On the same occasion, the dwelling-house, No. 73, Seymour-place, Bryanston-square, rent 52*l.* 10*s.*, term twenty-two years, ground-rent 6*l.*, was sold for 580*l.*—*Metropolitan.*

Speed of Railway Trains in England.—Among other improvements which have been effected by the application of capital to duplicating lines, and putting in new sidings for marshalling traffic, are the greater speed of the trains generally, and a corresponding saving in fuel, wages, &c. The subject has been duly noticed at the half-yearly meetings. The *Railway Record* gives the following summary of the maximum averages now made on the different lines:—Great Western, 53½ miles; Great Northern, 51; London and Brighton, 47½; London and North-Western, 47½; Midland, 46; London, Chatham, and Dover, 45; South-Eastern, 45; Great Eastern, 44; London and South-Western, 44.

The Chromograph.—This is a very ingenious arrangement for producing a number of copies of manuscripts, sketches, or plans. The first copy having been made with prepared ink, is pressed slightly against an absorbent composition, which retains the impression so firmly as to give off a number of copies, yet so superficially that a wet sponge can easily erase it, as though it were a slate whitened with slate-pencil. The composition is quickly susceptible to heat, and in its softened state can be easily re-smoothed and levelled. We have tried it to the extent of fifteen copies of a letter with perfect success.

Oak and Teak.—In 1878 there were imported into Great Britain 60,254 loads of oak, of the estimated value of 354,916*l.*, against 120,118 loads in the previous year, being a decrease of 59,864 loads. The various oak-producing countries contributed as follows:—Russia, 3,151 loads; Germany, 25,048 loads; Austria, 3,014 loads; United States, 2,641 loads; British America, 25,402 loads; other countries, 998 loads.——Last year, 37,990 loads of teak were imported to Great Britain, against 28,072 loads in 1877, showing an increase of 9,918 loads.—*Timber Trades' Journal.*

Moulton.—In connexion with the old-established endowed school known as Bliss's Charity at Moulton, Northamptonshire, a large building and master's house are in course of erection on an excellent site opening on to the village green. Messrs. E. F. Law & Son, of Northampton, are the architects, and Mr. Roberts, of Weedon, the builder. The structure is in the Gothic style, and contains girls', boys', and infants' schools, and a room for the more advanced boys in addition to class-rooms.

A Contract for the works on the extension of the Central Queensland Railway, Rockhampton, from the end of the present work, 170 miles, westward for a length of twenty-seven miles, has just been secured by Messrs. O'Rourke & M'Sherry, local contractors, for the sum of 52,754*l.*, equal to about 1,954*l.* per mile, the Government finding the rails, fastenings, &c.

Lucky Partners.—When Mr. James Shaw, of Leadenhall-street, bought the great iron and copper establishment of the Governor and Company of Copper Miners at Cwm-Avon, in South Wales, in April, 1877, he assumed as partners Mr. James Spence, of Liverpool, and Mr. John Dixon, of Cleopatra celebrity. This partnership has just been dissolved by Mr. Shaw paying out these gentlemen, who have received within a little over two years no less a sum than 38,500*l.* over and above the capital they embarked. The business has been entirely managed by Mr. Shaw, his two partners never having occasion to spend ten days at the works. Complaints of the iron trade have no reason to be made by these gentlemen who have been engaged in it, and we congratulate Mr. Shaw on his hard-earned and well-deserved success.—*City Press.*

TENDERS

For new infant school at Hounslow. Mr. C. Innes, architect:—

Wheeler & Co.	£2,240 0 0
Gamage	1,710 0 0
Collinson	1,650 0 0
Stephenson	1,630 0 0
Beale	1,600 0 0
Walter & Reavell	1,545 0 0
Taylor	1,528 0 0
Haynes	1,500 0 0
Jones & Co.	1,488 0 0
Raymes	1,473 0 0
Dorey	1,413 0 0
Brunsden	1,400 0 0
Wiles	1,345 0 0

For alterations and additions to Park House, Wimbledon, Surrey, for Lady Christian Maule. Messrs. Whitfield & Thomas, architects. Quantities by Mr. T. M. Deacon:—

Avins & Co.	£2,940 0 0
Clemence	2,845 0 0
Jossett	2,470 0 0

For proposed new steam laundry for the National and Provincial Steam Laundry Co. Mr. Ernest Turner, architect. Quantities by Mr. Riddett:—

Kirk & Randall	£14,990 0 0
Conder	14,427 0 0
Brass	14,337 0 0
Browne & Robinson	14,250 0 0
Tyerman	14,000 0 0
McLachlan & Sons	13,980 0 0
Scrivener & Co.	13,510 0 0
Pyrell	13,151 0 0

For house and shop, West-street, Dorking, for Messrs. J. Young & Son. Mr. T. Cloutman, architect. Materials part found. Quantities supplied:—

Putney	£427 10 0
Hamblin, Bros.	405 0 0
Heselgrave	405 0 0
Lynn & Dudley	399 0 0
Goddard & Son (accepted)	398 0 0
Pledge	377 0 0
English	370 0 0

For proposed new buildings on site of Nos. 26 and 27, Cow Cross-street, for Messrs. Charles & Antony Beckmann. Mr. Thomas Milbourn, architect. Quantities supplied:—

W. & H. Salmon	£8,850 0 0
Snow & Co.	7,777 0 0
Anley	7,515 0 0
Merritt & Ashby	7,500 0 0
Steed, Bros.	7,360 0 0
Sabey & Sons	7,319 0 0
Jackson & Todd	6,700 0 0
Crabb	6,460 0 0

For alterations at the Euston-road Tavern, 73, Euston-road, for Mr. Alexander Hicks. Mr. James R. Furniss, architect. Quantities supplied:—

Grimwood & Sons	£1,993 0 0
Edgley	1,986 0 0
Temple & Forster	1,947 0 0
Gould & Brand	1,760 0 0
White	1,749 0 0
Anley (accepted)	1,650 0 0

For the erection of new Primitive Methodist school and cottages at Higham Hill, Walthamstow. Mr. William Ranger, architect:—

	School.	Cottages.
Trigg	£550 0 0	£550 0 0
Richardson	504 0 0	430 0 0
Burbridge	456 0 0	540 0 0
Challis	500 0 0	360 0 0
Norman (accepted)	465 0 0	384 0 0

For the restoration and additions to Crawley Church, Sussex. Mr. H. Woodyer, architect. Quantities by Mr. G. Cox:—

Woolgar	£3,082 0 0
Cook	2,973 0 0
Card	2,613 0 0
Charlwood	2,576 15 0
Rowland	2,537 10 0
Mitchell	2,535 0 0
Longly	2,495 0 0
Goddard	2,330 0 0
Beale (accepted)	2,190 0 0

For a pair of villa residences, Rectory-road, Wandsworth. Mr. A. Searle, architect. Quantities supplied:—

Scott	£2,742 0 0
Smith	2,640 0 0
Lathey, Bros.	2,470 0 0
Turtle & Appleton	2,355 0 0
Stimpson & Co.	2,283 0 0
Smith	2,192 0 0
Johnson (too late)	2,147 7 0
Beale (accepted)	2,0.0 0 0

For the erection of a house and buildings, exclusive of 63,000 bricks, 16 windows and frames, 11 doors, &c., for Mr. R. Hardwicke, at Goff's Hill, near Crawley, Sussex. Mr. Peter Wood, architect:—

Burton	£2,030	0	0
Beale	1,815	0	0
Mitchell	1,440	0	0
Cooke (accepted)	1,115	5	11
Groome	1,100	0	0

For building new church, Huddersfield. Mr. J. Brown Norman, architect. Quantities by Mr. W. Hofmann Wood:—

Smith, Walker, & Co.	£4,000	0	0
Barker	2,987	0	0
Wilson & Stead	2,943	10	0
Kendall	2,894	5	0

For works proposed to be done in erecting a studio at No. 24, Cavendish-road, St. John's Wood, for Mr. Thomas Faed, R.A. Mr. William Wallace, architect:—

Wilkins	£560	0	0
Cox	538	0	0
Tavener & Son	508	0	0
Downing & Sons	495	0	0

For works proposed to be done in erecting a studio at No. 22, West Cromwell-road, South Kensington, for Mr. Hugh Brown Muir. Mr. William Wallace, architect:—

Cox	£1,017	0	0
Wilkins	892	0	0
Tavener & Son	879	0	0
Downing & Sons	820	0	0

For alterations and bar-fittings at the Beehive, Crawford-street, for Mr. Plumbridge. Mr. W. E. Williams, architect:—

Marr (accepted)	£1,700	0	0

For alterations to the Royal Duke, Commercial-road, E., for Messrs. Truman, Hanbury, & Buxton. Mr. W. E. Williams, architect:—

Anley	£344	0	0
Eaton	342	0	0
Marr (accepted)	327	0	0

For alterations at the Castle, Shouldham-street, W. Mr. W. E. Williams, architect:—

Eaton	£637	10	0
Anley	517	0	0
Marr	495	0	0
Wicks	435	0	0

For alterations, No. 1, Clarges-street, Mayfair. Mr. T. H. Watson, architect:—

Curtis	£553	0	0
Scott	495	0	0
Marr	452	0	0
Carr	450	0	0

For rebuilding the Greyhound, Lea Bridge-road. Mr. H. B. Cotton, architect:—

Williams & Sons	£3,493	0	0
Shurmer	3,169	0	0
Andrews	3,145	0	0
Toms	3,063	0	0
Marr	2,991	0	0
Cocks	2,989	0	0
Eaton	2,845	0	0

For rebuilding the Buffalo, Appold-street, Finsbury. Mr. E. Brown, architect:—

Browne & Robinson	£2,040	0	0
Griffiths	1,900	0	0
Salt	1,875	0	0
Hayworth	1,795	0	0
Christopher	1,754	0	0
Marr	1,612	0	0
Outhwaite	1,610	0	0

For public elementary school, for 385 children, for the Thaxted School Board. Messrs. G. Perry & Slater, architects. Quantities by Mr. L. C. Riddett:—

	School Buildings.			Master's House.			Playgrounds and Boundary Walls.	
Ratcliffe	£4,098	0	...	£905	0	...	£777	0
Davis & Cock	3,770	0	...	772	0	...	923	0
Jones & Co.	3,335	0	...	680	0	...	1,060	0
Glasscock	3,300	0	...	670	0	...	726	0
Brown	3,070	0	...	615	0	...	810	0

For approaches and iron bridges, &c., for the Joint Committee, L. & Y. & W. L. Railways and Southport Corporation. Mr. R. B. Perring, C.E. Quantities supplied by Mr. Glendining:—

Braddock & Matthews (accepted).

For additions to the North-street Schools, for the West Ham School Board. Mr. J. T. Newman, architect. Quantities by Messrs. Curtis & Sons:—

Abrahams	£2,995	0	0
Gregar	2,750	0	0
Reed	2,750	0	0
Knight & Duston	2,738	0	0
Hoskings	2,727	0	0
North, Bros.	2,697	0	0
Norton & Son	2,626	0	0
Morter (accepted)	2,520	0	0

For additions to the Channelsea Schools, for the West Ham School Board. Mr. J. T. Newman, architect:—

North, Bros.	£583	0	0
Hoskings	557	0	0
Gregar	495	0	0
Maddison	479	0	0
Reed	465	0	0

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